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ABSTRACT

This collection of articles focuses on natural disasters from earthquakes to famines in developing nations and on the human response from immediate reactions to long term social, political, and economic adaptations that result in social change and development. The introduction, "Disaster Context and Causation: An Overview of Changing Perspectives in Disaster Research" (A. Oliver-Smith) discusses natural disasters, the scientific warning of impending extinction, and the relationships among the environment, people, and their culture. The titles of the articles are: (1) "Decades of Disaster: Promise and Performance in the Callejon de Huaylas, Peru" (P. L. Doughty); (2) "It Shook, Again: The Mexico City Earthquake of 1985" (S. S. Robinson and others); (3) "Earthquake, Tsunami, Resettlement, and Survival in two North Pacific Alaskan Native Villages" (N. Y. Davis); (4) "Algae: A Minor Disaster in the Jezreel Valley, Israel" (S. H. Lees); (5) "The Role of Social Relations in the Response to Riverbank Erosion Hazards and Population Resettlement in Bangladesh" (M. Q. Zaman); (6) "Drought and Desertification as Constraints on the Agricultural Development of the Western Sudan" (W. I. Torry); and (7) "Coping with Famine, Drought, and War in Sub-Saharan Africa" (A. Hansen). (DJC)

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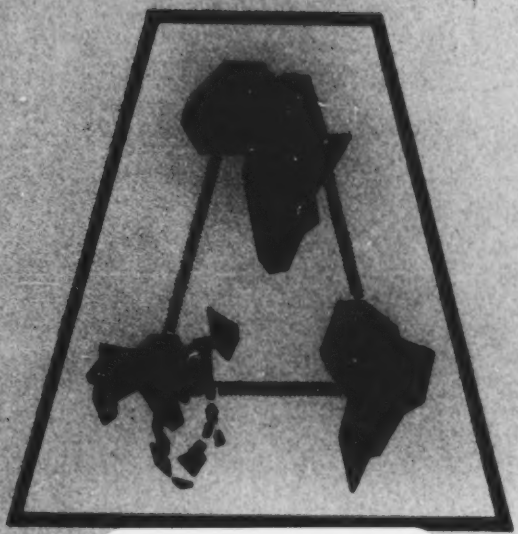

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CONTENTS

Publication Number Thirty-Six June 1986

NATURAL DISASTERS AND CULTURAL RESPONSES

ANTHONY OLIVER-SMITH
Guest Editor

PAGE

Introduction - Disaster Context and Causation: An Overview of Changing Perspectives in Disaster Research
Anthony Oliver-Smith 1

Decades of Disaster: Promise and Performance in the Callejon de Huaylas, Peru
Paul L. Doughty 35

It Shook Again -- The Mexico City Earthquake of 1985
Scott S. Robinson, Yolanda Hernandez Franco, Rosario Mata Castrejon, and H. Russell Bernard 81

Earthquake, Tsunami, Resettlement and Survival in Two North Pacific Alaskan Native Villages
Nancy Yaw Davis 123

Algae: A Minor Disaster in the Jezreel Valley, Israel
Susan H. Lees 155

The Role of Social Relations in the Response to Riverbank Erosion Hazards and Population Resettlement in Bangladesh
M. Q. Zaman 177

Drought and Desertification as Constraints on the Agricultural Development of the Western Sudan
William I. Torry 201

Coping with Famine, Drought, and War in Sub-Saharan Africa
Art Hansen 227

Notes on Contributors 255

INTRODUCTION

DISASTER CONTEXT AND CAUSATION: AN OVERVIEW OF CHANGING PERSPECTIVES IN DISASTER RESEARCH

ANTHONY OLIVER-SMITH
University of Florida

The archeological and historical records indicate that few eras have escaped the calamities and disasters that disrupt the lives of people and societies. Some eras, however, seem to be particularly plagued by suffering and tragedy, and it can be argued that such periods mark and reflect the pivotal changes in human history. Indeed, our own age seems particularly shadowed not only by our many wars and disasters, but also by the possibility of ultimate catastrophe-nuclear holocaust.

Many of the disasters that plague the 20th century are much the same as those that have afflicted humankind since our beginnings. Droughts, floods, earthquakes, avalanches, volcanic eruptions, typhoons, hurricanes and other geophysical and climatological forces have been forces that human society has had to cope with throughout our existence. However, immeasurable suffering and destruction have recently issued as well from our inabilities to control our own technology and social relations. In many cases, technology has allowed us to make vast improvements in our lives, but increasingly we find that in solving one problem, we create others, often of more difficult and serious

consequence than the original. In October 1986 at the National Forum on Biodiversity convened by the National Academy of Sciences and the Smithsonian Institution, a warning was issued of a forthcoming wave of extinction, approaching in magnitude the one which extinguished about half of all existing species, including the dinosaurs, some 65 million years ago. The major difference between the past and the potential cataclysm is that the one now developing has been caused by human activities. In effect, we have crossed or are on the verge of crossing key thresholds in the earth's systems and cycles of renewal, endangering its capacity to sustain our ever-growing population (Brown and Postel 1987:4).

It might be argued that technosocial disasters are inadvertent, and, yet, despite our greater understanding, the despoiling of life-supporting environments for political-economic motives continues relatively unabated over the globe. Many would claim that the wars which have afflicted this and other centuries have also been inadvertent. This might be true insofar as we seem only marginally capable of controlling our social interactions on a national and international scale. Our one-sided emphasis on developing technological responses to these challenges without regard for their impacts has not only created disaster in the natural environment, but has made us into phenomenally efficient killers of our own species as well. The crowning achievement of our technological perspective, harnessing the atom, has brought us to the edge of the ultimate disaster, the destruction of the planet. In a way, the threat of nuclear war has made us all victims, all homeless, if home is a place where one is safe. In that symbolic sense, disaster threatens to become the mind-set for the planet. We have all been cut off and set adrift from certain traditional forms of security by modern life, and the threat of nuclear war has compounded this by making us all vulnerable to a seemingly blind and uncontrollable mass destruction. In that sense, then, in our century, as in no other, disaster has become a model for interpreting life. Everyone, not only the millions of disaster victims and war refugees, is now bonded in a catastrophic vision by the threat of nuclear war. The lament of many a disaster victim, "It seemed like the end of the world," has become a real possibility and a universal fear.

Notwithstanding our catastrophic preoccupations, one of the more enduring assumptions in current popular as well as some scientific circles seems to be that disasters are extreme events, freak occurrences, one-in-a-million long shots in what is otherwise uneventful normality. Actually the occurrence of disasters is rather more the rule than the exception. Indeed, human cultures traditionally have built-in coping mechanisms designed to weather the extremes of ecological processes (Johnston and Selby 1978:468). Nonetheless, the second half of the twentieth century seems to have been shown to be increasing in severity of impact measured in terms of mortality.

Disasters, as few other research subjects, throw both theoretical and practical issues into high relief; the first, by their tendency to lay bare the essential features and processes of social and cultural organization (Firth 1959) and, second, by the urgency of the needs of those threatened or stricken by disasters for effective prevention, protection, relief or reconstruction. Indeed, these are crucial times to be involved in disaster research. Not only are the events and processes of disasters becoming more acute, but the methods and theoretical approaches to understanding the contexts, causes and consequences of disasters are in a state of flux. The purpose of this article, then, is to consider both the question of the increase in severity of impact of disasters and the related changes which are taking place in the field of disaster studies. My intention is to trace in broad outline the course of disaster research in the context of recent developments rather than to conduct a detailed review of the literature, a task far beyond the dimensions of the present effort, which has been ably undertaken by Quarentelli and Dynes (1977), Torry (1979b), Hewitt (1983), Kreps (1984) and Drabek (1986), all of whom I draw on extensively.

INCREASING HAZARDS OR VULNERABILITIES?

The title of a recent article on disasters and disaster research asked the unsettling question, "Is the Environment Becoming More Hazardous?" (Shah 1983). I describe this question as unsettling not only for its threatening implications, but also because it seems to cast doubt on the coherence, integrity and efficacy of aspects of an entire

world view dealing with the relationship of human beings to nature, especially as that relationship and its accompanying ideological underpinnings developed in the west. Western culture has tended to portray nature, to use Tennyson's words, as "red in tooth and claw," a vision nourished by Christian theology which saw nature as fallen and evil (Peacock 1986:15). Indeed, the efforts of the west have, from most philosophical as well as political economic perspectives, been dedicated to the taming, the domestication and control of the forces of nature for the benefit of human beings, or at least some human beings. Until quite recently, I think we rather prided ourselves on the success of these efforts.

The answer to that unsettling question is more complex than it might appear. Certainly, it involves more than a straightforward tallying of the number of disasters, although such statistics in themselves reveal several important trends which should be considered.

The most recent survey of disaster statistics (Thompson 1982), actually an update of two previous statistical summaries (Sheehan and Hewitt 1969; Dworkin 1974), clearly demonstrates that the average number of disasters per year has not increased significantly. Sheehan and Hewitt's figures reveal an average of 27.19 disasters per year between 1947-67. The average for the total 35 year period encompassed by all three studies was only 10% higher at 30.3 disasters per year (Thompson 1982:6). However, the number of deaths per year caused by disasters increased from 21,041 between 1947 and 1967 to 64,493 between 1968 and 1973 and then declined to 47,398 from 1974-81 (Thompson 1982:4). The decline in the death toll between 1974-81 must be seen in the context of the striking fact, particulary in light of recent African history, that none of the researchers considered droughts or drought-linked famine as disasters, thereby reducing significantly the recent averages. Indeed, the Ethiopian drought-linked famine of the early seventies accounted for roughly 100,000 lives as did similar conditions in the Sahel in roughly the same period (Hansen, this volume; Sen 1981:86; Sheets and Morris 1974). Considering the plethora of disasters in the eighties, including such major calamities as the Indian drought of 1982 which threatened 100,000,000 with starvation, the Armero tragedy in Colombia in 1985 which killed 25,000 people, the Mexico

City earthquake also in 1985 which left at least 7,000 dead and 50,000 homeless and the recurrence of major droughts in the Sahelian and East African regions in which more than a million people are estimated to have starved to death, it is not unreasonable to expect such figures to display a significant increase. Furthermore, a comparison by region of the death toll per millions of population reveals that high mortality rates are now predominantly located in Third World regions.

Region	Deaths Per Million
North America	31.5
Europe	38.57
Central America/ Caribbean	918.16
South America	341.33
Asia	376.28
Africa (excluding droughts)	117.05
Australia/Oceania	323.5

(Based on data from Thompson 1982:14-16).

Thus, while the number of disasters may not be increasing markedly, the catastrophic impact of these disasters in terms of loss of life is increasing and is concentrated in the Third World. In crude numbers, in the years between 1947 and 1981, 1,120,886 of a total 1,207,700 deaths from disaster (roughly 92.8%) came from Asia, Africa and Latin America (based on data from Thompson 1982:9). All this without mentioning the economic costs. The Bangladesh floods of 1974 inflicted damage amounting to 580 million dollars effectively destroying that country's hopes of reducing its import deficit of food and severely damaging jute production, which is the major export (Long 1978:155). The Guatemalan earthquake of 1976 left a total of 748 million dollars of damage in its wake and is estimated to have retarded economic development by at least ten years (Long 1978:155). The Mexico City earthquake of 1985 did 4 billion dollars damage, approximately 2.7% of the projected GNP for that year and severely inhibited tourism, one of the major generators of that nation's foreign exchange (see Robinson, et al., this volume). The relatively constant

numbers of disasters coupled with increasing numbers of deaths and catastrophic economic losses leave us with an interesting conclusion regarding Shah's question.

The environment may not be becoming more hazardous, but we seem to be suffering more severe impacts from natural disaster agents. A number of possible interpretations thus occur. One possible alternative is that while the numbers of disasters may not be increasing, the force of those that occur is greater than ever before, thus accounting for the greater loss of life. However, according to researchers at the Disaster Research Unit of the University of East Anglia, no major geological or climatological changes over the last fifty years can adequately explain the increase in disaster impact. Even in the fact of the major droughts in Africa and Asia, a review of all the evidence of climatic change did not reveal enough evidence to warrant a case of major climate variation (O'Keefe, Westgate and Wisner 1976:566).

Another possible conclusion is that disaster mortality has always been high and that our technology is not as effective in protecting us as we thought. This possibility is not as easy to establish since the sort of global statistical data necessary are not available before the mid 1940s. However, the historical record provides a number of selected examples which indicate that certain aspects of technology have indeed increased our abilities to withstand the effects of natural onslaught. Certainly the greatest calamity of historical record, the Black Death of the 14th and 15th centuries which claimed over 25 million lives, or roughly 25% of Europe's population, would be easily within our capacity to contain and eradicate with antibiotics today (Gottfried 1983; McNeil 1977). Indeed, plagues no longer figure on the lists of disaster agents which afflict humanity, a fact which may be altered soon by the AIDS epidemic. Advances in meteorology have enhanced weather prediction and provided advanced warnings for hurricane impacts, thereby reducing potential mortality. Current mortality rates for hurricanes do not remotely approach the 20,000 dead in the "Great Hurricane" of October 10-18, 1780 which swept through Barbados, Saint Lucia, Saint Vincent, Martinique, Dominica, Saint Eustatius and Saint Kitts (Gibney 1978:83). However, the 5000 dead in Honduras after Hurricane Fifi in 1974 attest to the fact that even with

improved technology of prediction in the first world, the vulnerability of Third World peoples to disaster impact may not be decreased.

The distribution of high mortality rates in Third World nations, the average of which is roughly ten times greater than the average mortality rate of the developed nations of Europe and North America, would suggest that we have not overestimated the effect of technology on the control of disaster impact. The low averages for the developed nations of the world indicate that in certain aspects of disaster prediction and mitigation, technology has served us well.

A third possible conclusion is that the impact of human systems on the environment and the increase of human populations in disaster prone regions have increased the risk and scale of impact of natural phenomena. In effect, the environment has not become more hazardous. Through human intervention, vulnerability to natural hazard in certain world regions has been increased.

DEFINITIONS AND DISASTERS

If this is so, the environmental or geophysical aspects of disaster are only part of the story and attention must shift to the relationship between the environment and human beings and their culture. A disaster occurs with the coincidence between a physical phenomenon and a human population. But what is a disaster? The word itself has many connotations. A common dictionary definition states that a disaster is "a calamitous event, esp. one occurring suddenly and causing great damage or hardships" (Urdang 1968:377). However, even when the term has a specific reference, disaster may have a variety of meanings, referring alternately to the "agent" (earthquake, fire, hurricane, etc.), the impact inflicted by the agent, or the evaluation of the impact (for example, "conditions in the post impact situation are disastrous"). It is clear that the agent itself is not enough to define a disaster. A hurricane at sea is not seen as a disaster unless there are ships and human lives involved. A disaster involves two elements: a natural (or man-made) phenomenon and a human population.

What really constitutes a disaster, then, is the combination of a destructive agent from the natural and/ or man-made environment and a group of human beings living in a specific local socio-cultural context in addition to regional, national and international spheres as well; all demographic, biological, social, cultural, political, economic, infrastructural and ecological aspects are affected. Consequently, a disaster occurs when a natural or man-made phenomenon coincides with a society producing damage or loss to the major social organizational elements and physical facilities of a community to the degree that the essential functions of the society are interrupted or destroyed, resulting in individual and group stress, and social disorganization of varying severity. What is crucial to recognize, and indeed, inescapable given the previously outlined data from disaster statistics, much less the history of the last two years, is that human groups and institutions play a far more active role in the creation of destructive agents and circumstances than is usually imagined or portrayed. Recognition of the role of human groups and institutions in disaster causation has led to a recent revitalization of debate in disaster research. Indeed, the title of this volume, while descriptive of its content, suggests a greater separation between nature and culture in disasters than is indicated by recent research and writing.

THE DEVELOPMENT OF DISASTER STUDIES

Although disasters have provoked the attention of chroniclers, historians, and novelists since the time of the Greeks, the field of social scientific disaster research marks its inception from the publication in 1920 of Samuel Prince's Catastrophe and Social Change, a study of the event and impact of the explosion of a munitions ship in Halifax Harbor. Although the pioneer study of disaster by Prince posed a spectrum of important theoretical challenges regarding social structure, crisis, and social change, he was followed by few in his interests (cf. Carr 1932; Sorokin 1942). With the onset of World War II crisis and disaster studies understandably began to narrow their focus to research on stress and behavior, particularly under wartime conditions and situations, such as air raid alerts, bombardment, and combat stress. This behavioral emphasis continued into the post-war period with projections of behavior

of individuals and organizations in nuclear attack scenarios as well as studies of natural disasters. By the time the Committee on Disaster Studies (later reorganized as the Disaster Research Group) was created by the National Academy of Sciences and the National Research Council in 1952, the behavioral focus had broadened to include both individual and organizational behavior in emergency situations.

Since the 1950s two disciplines, sociology and geography, have tended to dominate the field, creating what has been variously called a "paradigm" (Kuhn 1962 as quoted in Hewitt 1983:4) or more recently as "academic research consensus" (Said 1978:275 as quoted in Hewitt 1983:4). This academic research consensus (ARC) took on the characteristics of a scientific world view in terms of defining the parameters and the issues of relevance of the field. Since the ARC has developed out of two disciplines, sociology and geography, it, in effect, has had two branches which I have chosen to call the behaviorist and the environmentalist branches respectively. For the most part, both branches of the ARC have focused on the disaster event, its agent and its impact and/or the response of the stricken population with token attention given to the interplay between environments and human systems, particularly larger political economic systems, in disaster causation.

In general, from the 1950s until quite recently, the behaviorist wing of the ARC has chosen to focus primarily on questions of individual and group behavior in disasters. In the late 1960s Barton examined such issues as role definition, behavior and conflict of individuals in disaster, in part to elucidate and forecast the rise of the "therapeutic community" (1970). Dynes developed a similar concern for the behavior of formal organizations, such as police and fire departments in disasters which focused on the structures, functions and activities of formal organizations, and the impact of disaster on these organizational elements in the community context (1970). He shared with Barton an interest in the appearance of an "emergency consensus", the development of norms stimulating altruistic behavior and minimizing conflict in disaster contexts. Other organizational foci of sociological research were the family, welfare and social service agencies, hospitals, the military, civil defense agencies and utilities departments. The tendency of

disasters to create "emergent" groups, that is, entities which did not exist prior to the disaster and which often cease to exist once the disaster is over, has been an enduring interest in sociology. Other researchers have looked at the mental health implications of natural disasters, concluding that in most cases there were few long term effects on individual or community mental health (Bates et al. 1963). There has also been a concern in sociology for the elaboration of models of disaster event sequences and organizational behavior in the time phases of disasters. The latest compendium of sociological findings on disasters reflects this temporal orientation in its organization inventorying and coding findings from the literature in accordance with such stage or phase-like segments as planning, warning, evacuation and other forms of pre-impact mobilization, pre-impact emergency systems, restoration, reconstruction, hazard perceptions and attitudes toward and the adoption of adjustments (Drabek 1986).

In addition, the vast majority of the sociological research has taken place in the developed world and that largely in the United States, placing a somewhat severe limitation on the applicability of many findings to other cultural contexts. Recent efforts to examine the aftermath of natural disasters in American communities reveal minimal social changes, and massive aid and economic costs largely borne by the larger carrying society, conclusions of dubious utility outside the developed world (Friesema et al. 1979; Wright et al 1979). However some recent contributions in the field of disaster relief have considered cultural variables in assessing impact, aid and change in international contexts (Cuny 1983; Alexander and Sipe 1977; National Academy of Sciences 1979). Nonetheless, the sociological literature in general has suffered from a lack of comparative perspective and has had a tendency to pronouncements of unfounded universalism, gathered by research in the Euro-American context and applied uncritically to non-western societies (Torry 1979a:46).

Only relatively recently have sociological researchers turned their attention to larger questions of social change with an emphasis on pre-impact conditions as a source of post-impact changes. Indeed, the increased awareness that patterns within the social order are both causes and consequences of environmental vulnerability seems to have

arisen with the realization that if disaster research is to realize its full potential at both the theoretical and applied levels, it must be both interdisciplinary and cross-cultural (Kreps 1984:309). There is beginning to appear a shift from the role behavior/formal organization foci to more social systemic questions such as the resilience or lack thereof of societies in the face of the crisis of disaster threat and/or impact. Researchers have also begun to examine the effects of different kinds of aid, and the various sources of delivery and distribution in terms of its implications for local patterns of inequality, distribution of wealth, and overall structures of social stratification (Bates et al.:1982). Also addressed are issues dealing with the social basis of risk perception and assessment, disaster prevention, preparedness, response and recovery. As Kreps (1984) points out, these are questions which have been part of the intellectual tradition of disaster studies for a long time. However, the question of disasters as laboratories for the study of these questions involving the viability and resilience of a society (Fritz 1968), often cited as one of the theoretical touchstones of sociological disaster studies, has rarely been tackled explicitly as a research topic. Indeed, due to lack of comparative, cross-cultural studies, there was an implicit standard that increasingly higher levels of material resources were both the explanation and key to societal resilience and viability in the case of disasters (Hewitt 1983). In sum, while the majority of sociological disaster studies remain focused on immediate individual and organizational behavioral issues in the American context, interdisciplinary perspectives are now no longer seen to be of questionable value to sociology (Quarentelli and Dynes 1977:44) and cross-cultural research is a recognized need to address the larger theoretical issues inherent to the field and the pertinent practical problems which societies face in confronting the threat and impact of disasters (Kreps 1984).

Where sociology has until recently tended to focus on individual and organizational behavior in "extreme" situations, the orientation of geographic researchers from the 1950s through the 1970s has been that disasters are the results of "extremes" in geophysical processes (Hewitt 1983:5). From this environmentalist perspective, the occurrence of disasters is due to the existence of natural hazards, defined as extreme geophysical events, such as avalanches, coastal erosion, drought, earthquakes, floods,

frost, hail, hurricanes, tornadoes, volcanic eruptions, etc. which are hazardous because human adaptation to them is imperfect or incomplete (Waddell 1977:69).

If the environment generally played a minor role in sociological analyses of disasters, the same might be said of social and cultural systems in social geographic research. Social geographers of course acknowledged the influence of social and cultural systems on human responses to natural disasters, but only in recent years has that recognition been substantially more than modest in assigning importance to social and cultural variables. In effect, the focus of social geographic research has been primarily on the geophysical and climatological properties and processes that subject human societies to the risk of disaster. This research, in many cases on risk perception in hazardous areas, however, is not generally placed in any clearly defined social and cultural context. In effect, social and cultural variables are either held to be constant across societies or have been assigned such minimal importance that they are treated only in a very general fashion. As recent criticisms of the social geographic school have asserted, this research assigns the active role in the human-environment relationship to geophysical and climatological factors and the passive role to human systems (Hewitt 1983; Torry 1979c; Waddell 1977). In effect, the social and cultural systemic dimensions of human interaction with the environment in hazardous situations are rarely ever assigned significant roles as factors constraining human options, and this is also and especially true of larger political economic dimensions. Basically, the geography of risk is equated with the spatial distribution and frequencies of geophysical extremes (Hewitt 1983:5).

Where culture and society can affect the human-environment relationship in social geographic research and related fields is in the realm of scientifically oriented intervention and policy. This orientation is reflected in those areas of study emphasized in these fields, namely scientific research and monitoring of geophysical processes with special attention to enhancing prediction, planning and managerial strategies for containing hazards through technology, and sociological realignments according to hazard distributions and frequencies (Hewitt 1983:6). The more social scientifically oriented aspects of this research

have focused on exploring how particular hazards, such as floods (White 1974), are perceived and how communities have adjusted to risks, responded to predictions and coped with destruction. These two foci in social geography coupled with the sociological focus on individual and organizational behavior in disasters with applications for the design of disaster plans and the organization of relief and rehabilitation efforts constitute what Hewitt has criticized as a distinctly "technocratic" approach to disasters (1983:7).

NEW DIRECTIONS IN DISASTER RESEARCH

The challenge to the disaster studies ARC and its technocratic approach to disasters began to emerge in the mid 1970s in the work of a number of social geographers and anthropologists working in Third World contexts. Indeed, it has often been the case and is certainly part of the anthropological perspective that the experience and knowledge gained in cross-cultural contexts have formed the basis of a position from which to critique and amend sociological universalisms and theories generated in the industrialized world. It has also been the case that the substantive critiques and theoretical advances in science often come from outsiders working beyond the contextual and theoretical boundaries of the dominant paradigm (Feyerabend 1980:64).

Prior to this time most social geographers fit fairly comfortably within the research consensus of the environmentalist branch of the ARC. Although anthropologists had had a long tradition of studying among populations living in stressful and hazardous environments, their generally holistic ethnographies, while providing valuable data and perspectives on adjustment and responses to risk and impact, did not specifically focus on disasters. The early anthropological work dealing explicitly with disasters did not emerge until the 1950s and 1960s (Belshaw 1951; Keesing 1952; Wallace 1956, 1957; Spillius 1957; Schneider 1957; Firth 1959; Lessa 1964;Davis 1964; Schwimmer 1969). Although some of these anthropologists shared the immediate behavioral emphases of the sociologists of the ARC, others were more concerned with the implication of disasters for lasting impacts on social structure and organization and perspectives on social change in general. In the first instance, the work of

Wallace, including a tornado study (1956a), a theory of behavior in cultural crisis (1956c; 1957) and his landmark paper on revitalization movements (1956b) link the issues of disaster, cultural crisis and response in one of the major contributions to middle range theory of the last fifty years. Moreover, the three works issuing from the volcanic eruption of Mt. Lamington in Papua, New Guinea deal specifically with problems of aid-induced change as well as immediate behavioral consequences. (Belshaw 1951; Keesing 1952; and Schwimmer 1969). Schneider (1957) also presages a much later concern in disaster research by considering typhoons on Yap as part of process rather than as extreme, unexpected events. In effect, the early anthropological studies of disaster both paralleled the sociological emphasis on behavior and previewed some of the later concerns with process and change which are now challenging the organizational and behaviorist perspective.

In addition to those few studies devoted specifically to disasters, the growth of another anthropological research area, specifically resettlement studies, has consistently since its beginnings offered important insights into both behavioral and structural responses to disruption and crisis situations which are extremely relevant to disaster studies. Historical, ethnographic and applied research by anthropologists on forced migration and resettlement include, among many others, work with the Navaho (Scudder 1982), Japanese-Americans (Leighton 1945; Spicer et al. 1969), the Gwembe Tonga (Colson 1971), Egyptian Nubians (Fahim 1968), Bikinians (Kiste 1974), the Banabans (Fiji) (Silverman 1971), Ghanaians (Brokensha 1964), the Zande (Reining 1966), Somalian nomads (Merryman 1982), Mexican peasants (Partridge, Brown and Nugent 1982), as well as collected and comparative work on dam relocations (Brokensha and Scudder 1968) and relocations due to disaster, political upheaval and development projects (Hansen and Oliver-Smith 1982). As Torry has pointed out, such coerced dislocation evokes a crisis similar to that of a disaster in that entire communities are victimized, economic activity is disrupted and the affected group becomes dependent on outside aid (1978:170). These points are underscored by Hansen and Oliver-Smith in drawing attention to the similarities of problems and responses of people dislocated by disasters, political upheaval and planned change (1982; Oliver-Smith 1986; Hansen, this volume).

Real growth in the anthropological study of disasters began in the early 1970s simultaneously with the expansion of the cultural ecological perspective in anthropology, a more generalized concern for human-environment interactions, and a wave of major natural disasters, including the Peruvian earthquake of 1970, the East Pakistan floods of 1970, the 1971 Indian (Orissa State) cyclone, the Nicaraguan earthquake of 1972, the Indian droughts of 1972-73, the monsoon triggered floods of Pakistan, Bangladesh and northern India of 1973, the Sahelian drought of 1973-74, Hurricane Fifi in Honduras in 1974, the Guatemalan earthquake of 1975 and the T'angshan, China earthquake of 1976 among many others.

At roughly the same time that a small number of anthropologists began focusing on disasters in their research, a small group of social geographers were becoming involved in disaster research in Third World contexts. Both groups soon found that the theories, methods and findings of the disaster research consensus were proving inadequate to the task they were facing in the analysis of disasters in Third World contexts. Rumblings of dissatisfaction with the dominant school of disaster research began appearing in the literature from anthropologists (Torry 1978, 1979a, 1979b, 1979c; Oliver-Smith 1974, 1979) and from social geographers (Waddell 1977; Ball 1975; Wisner, O'Keefe and Westgate 1977; O'Keefe, Westgate and Wisner 1976; Wisner, Westgate and O'Keefe 1976). Dissatisfactions ranged from the dearth of relevant theory, lack of long term research, and ethnocentrism to the barely hidden ideological assumptions on which the dominant paradigm was based.

The perspective adopted by anthropological critics, principally and eloquently led by Torry, scored the dominant paradigm along three related major dimensions: the lack of interest in developing testable general theory grounded in comparative social systemic research, a one sided and environmentally deterministic view of risk aetiology, and a tendency toward facile and ethnocentric characterizations of Third World societies, leading to major misconceptions not only of disasters, but of programs and policies in the regions of highest disaster vulnerability. The ARC, while often couching its general goals in terms of the constructing and testing of theory on such important themes as societal resilience in crisis, stress and cultural innovation,

and long-term social change, rarely addressed these topics in specific projects. When I began my research in 1970 on disaster and social change in the Peruvian Andes (1986), apart from Prince's previously mentioned pioneer study, there was one relevant work in the entire sociological literature, and that focused largely on role theory in determining and measuring social change four years after a hurricane (Bates et al. 1964). That study was also virtually the only one of any length which adopted a long term perspective. In fact, the subject of long term problems of disaster and social change was purposefully omitted from Barton's comprehensive discussion of the state of disaster research "partly because so little detailed research has been done on them" (1970:54). Most of the relevant literature on the subject came from anthropologists (Davis 1964; Firth 1959; Spillius 1957; Belshaw 1951; Keesing 1952; Schwimmer 1969), scholars whose contributions to the field have yet to be recognized outside of anthropology in any major compilation of the field (cf. Drabek 1986).

The sociological emphases on individual and organizational behavior in the disaster stages of warning, impact, and immediate aftermath precluded interest in aetiology of risk while the geographic wing has been criticized for placing risk squarely at nature's door. Although that literature recognized that human factors obviously affect impact and the response of societies to disaster, the dominant paradigm has been taken to task for its perspective that disasters "arise within the order of nature rather than within the order of man" (Brown and Goldin 1973 as quoted in Torry 1979a). In neither branch of the dominant paradigm was there any significant attention paid to the role of local, regional or international social systems in the aetiology of risk (Morren 1983; Torry 1979a). Generally, if local populations placed themselves at risk, it was through ignorance and the corresponding policy was better information and education. There was little recognition of the importance of local folk beliefs and ideologies, much less the ideologies of larger systems, in the creation of risk and vulnerability (Torry 1979c; Bode 1977). Although it was recognized that disasters often had differential class impacts, the role of local, regional, national and international social and political economic structures in creating or exacerbating risk was not given much attention.

The final area of major criticism by anthropologists of the dominant research consensus was the overwhelming emphasis on western, developed societies with a corresponding ethnocentrism regarding the rest of the world. The sociological and geographic literature generally speaking ignored specific and general anthropological contributions to the field, and was therefore prone to statements of universal applicability and to characterizing non-western societies in condescending and ethnocentric terms. For example, Mileti, Drabek and Haas' (1975) contention that people tend to be unaware of the character and extent of proximate hazards is simply not supported by the ethnographic record of small societies whose very survival is posited upon a sophisticated and concise understanding of environmental factors, including hazards (Torry 1979a). Similarly, Dynes' claim that disasters in Third World countries inflict damage on people rather than on property ethnocentrically undervalues the significance and value of property damage in local terms (Torry 1978). It is true that in terms of dollar value, the adobe hut of an Andean peasant is worth less than the three bedroom middle class American home. However, the loss of that hut to its owner may be just as devastating, if not more so due to such factors as lack of insurance and low income, as the loss of the suburban home is to its owner. The disaster literature as well routinely labelled Third World peoples as "arational", "mystical", with "a traditional in-born fatalism," "fragile" social structures and institutions that are "flexible and easily abandoned" (Torry 1979a). As the dominant paradigm is so technocratically and policy oriented, the implications inherent in these statements for erroneous policies are potentially dangerous for target Third World populations.

Although these criticisms of the dominant paradigm do not exhaust the list, they are representative of the shortcomings perceived by anthropologists involved in disaster research. The dissident social geographers, some of whom played central roles in the formation of the ARC, and others of whom were trained by its practitioners, share many of the objections of the anthropologists and, indeed, predated the anthropological challenge to disaster research with their own. In many ways, the geographers, working against the dominant paradigm in their own discipline, attack the issues at a more profound level. If Torry, for example, criticizes disaster research for undervaluing human

contributions to disaster risk, such social geographers as Waddell (1977) question the very basis of the dominant school's perception of the human-environment relationship and its deterministic view of disaster causality. The human-environment relationship is interpreted by such dissidents as O'Keefe, Westgate and Wisner (1976) as much more dialectic in that just as natural forces such as drought may affect social structures, so can social forces such as development affect natural processes such as soil erosion (1976:548, citing Richards 1975). They call for a rethinking of the causal relationships involving people and nature. In effect, they are saying that disasters simply do not happen; they are caused. The high correlation between disaster proneness, chronic malnutrition, low income and famine potential leads these authors to the conclusion that the root cause of disasters may well be attributable to the structural imbalances between rich and poor countries. And they advocate replacing the term "natural disaster" with a more appropriate label such as "social" or "political disaster."

Waddell also accuses the dominant paradigm of being deterministic because human beings are seen as being essentially passive in the face of natural force (1977). Such a position is criticized because it inevitably leads to a technocratic program of hazard mitigation promoting greater communication of knowledge, greater use of technology, engineering, land management and social regulation, while ignoring the social and historical contexts and roots of disaster causality. The assumption of the dominant paradigm is that economic development, including commercialization of agriculture, production for export, and increased capitalization, processes, all of which have been blamed at least in part for the accentuation of drought conditions and the undermining of native coping strategies in Africa, will alleviate stress and reduce vulnerability. Waddell characterizes the whole approach as "an ethnocentrically developmental one whereby traditional societies are regarded as incapable of coping with natural hazards and therefore as dependent on modernization and the transfer of know how and technology for their future" (1977:73). He parallels Wisner, Westgate and O'Keefe (1976) in condemning the "conventional view" of natural disasters and the "orthodox" model of development and advocating the use of Marxist dependency interpretations for identifying the structural causes of disasters in the historical conditions and relations

of colonialism and exploitation that have existed between First and Third World nations for several centuries (1977:76). Ultimately, the dissidents maintain, it is the conditions of underdevelopment which force the poor, the most vulnerable, to leave relatively more secure forms of adaptation and move into increasingly vulnerable and hazardous economic and geographic circumstances (Susman, O'Keefe and Wisner 1983:278). These are the contexts in which disasters become eminently social rather than natural phenomena.

To summarize the anthropological and geographic challenge to the dominant paradigm in disaster studies, we can point to three broad areas of criticism: (1) the lack of research oriented toward true theory construction and testing on issues of social resiliency and change; (2) the lack of a holistically and historically grounded perspective in disaster analysis, which has produced a narrow behavioralist perspective among sociologists and an environmentally determinist view among geographers; and (3) a deeply embedded ethnocentrism regarding the world's most vulnerable regions, resulting in analyses and policy recommendations based on modernization models and strategies, many of which have been shown to be counterproductive and to place people at greater risk. This is not to say that there have not been other criticisms aimed at methods, theoretical issues and programmatic implications and strategies, but many of them fall into those broader categories which have been underlined.

Thus, the challenge to the dominant view contests the interpretation of disasters and offers alternative views emphasizing a reformulation of the basic premises of disaster research. Although all of the criticisms mentioned offer explicit alternative views and programs, the most encompassing formulation of an alternative interpretation of disaster is contained in Hewitt's introductory article to his edited volume Interpretations of Calamity (1983). Other contributions to the same volume, particularly those by Watts; Susman, O'Keefe and Wisner; and Morren, adopt and extend aspects of the alternative view outlined by Hewitt. Rejecting the dominant view that disaster is basically the collapse of the productive functions of the social order, the response to which must be the restoration of that "normal" order, Hewitt posits that most natural disasters are more

explainable in terms of the "normal" order of things than the accidental geophysical features of a place. Disasters are seen to be far more characteristic of places and societies than freak accidents. The risks that people run in their natural environments are in themselves "manageable," but are accentuated and resulting disaster impact is compounded by forms of "ordinary life," particularly in the conditions of structural disadvantage which characterize Third World societies. Such a reorientation of research emphasis places the common concerns and competence of anthropology, human geography and cultural ecology at the center rather than at the periphery of disaster research. Consequently, the focus of research must be on context- "the on-going societal and man-environment relations that prefigure (disaster)" rather than solely on events (Hewitt 1983:24-27).

Indeed, Hewitt explicitly posits that many natural phenomena would not be disasters nor would many of the damages occur were it not for the characteristic conditions of normalcy in which people have been forced to live by social and economic changes far beyond their control.

> Such social developments flowing from that most fundamental of all geographical and human ecological processes of modernization-alienation from the land-are integral to the unavoidable vulnerability of ordinary folk to natural calamity; to the futility of their developing a sophisticated knowledge of the risks even if they had the leisure for it; and, in the end, of the responsibility that indeed rests firmly upon centralized, technocratic institutions and hazards research (Hewitt 1983:27).

Seen in this context the Guatemalan reference to the 1975 earthquake as a "classquake" or the Peruvian reference to a "400 year earthquake" after the 1970 disaster are bitterly accurate assessments of "natural" disaster. And the American First Lady's remark on viewing the devastation after the 1970 Peruvian earthquake that the U.S. was going to help the victims until everything was "just rosy again" exemplifies the implicit belief of the disaster studies ARC that returning again to normalcy is going to solve everyone's problems. There is little recognition that the destruction and misery in Peru in 1970 were as much a

product of that nation's underdevelopment as they were of the earthquake.

Generally speaking, the content, if not always the tone, of these criticisms has been received as constructive and the alternative interpretation recognized as a valuable contribution (Kreps 1984; Drabek 1986). The vitality of present debate in the field is confirmed for example by two recent contributions from Torry which call into question explanations which express disaster causality solely in terms of "ultimate" causation; that is, in terms of systemic or structural causes such as underdevelopment or dependency (1986a:7). Asserting that "capitalism has no monopoly on famine," Torry cites the period of 1958-62 of the ill-fated Great Leap Forward in China which ended with "about 30 million excess deaths and about 33 million lost or postponed births" (1986a:11-12). While lauding dependency explanation for debunking the view that famines result from lack of rainfall, Torry highlights internal, "proximate" factors of local social stratification which result in inequalities of risk bearing and resource allocation as important for understanding famine impact and mitigation (1986a:11-12; 1986b). Indeed, implicit in this approach is a need to confront both natural and social causes of disaster at both the systemic and the local levels. Every disaster is a factor mix composed of elements of these four dimensions.

The articles offered in this volume focus on many of the concerns of both the dominant view and its various challenges. In terms of subject matter they include both rapid onset disasters such as earthquakes and relatively slow onset disasters such as famines. The agents of the disasters examined in these studies involve varying degrees of interplay between the environment and human systems, from an active natural/passive social "factor" mix to an "active social/passive natural" causal mix of factors. The papers focus as well on a wide range of human responses from immediate reactions to long term social, political and economic adaptations particularly as they pertain to social change and development.

The value of the anthropological methodology of in-depth social research over long periods of time is made immediately apparent in Paul Doughty's study of post-disaster assistance and recovery in the Callejon de Huaylas

in the aftermath of the 1970 earthquake in Peru. Doughty's long term research in the region in general and the community of Huaylas specifically affords him a perspective on the relationship between disaster, aid and political process which is rare in disaster research. Only long term research permits a perception that disaster impact may combine with major political change to compound the severity of effects on community integration and recovery by subverting "normal" political processes, particularly in the acquisition of aid. Doughty's research also underscores the pitfalls of disaster aid which, uninformed from a sociocultural perspective, takes little account of local needs and priorities.

The theme of the political nature of disaster and aid is continued in the article by Robinson, Hernandez Franco, Mata Castrejon and Bernard. For the case of the 1985 Mexico City earthquakes, the authors demonstrate that the disaster created the "political space" for a significant threat to the long reigning party in power on the basis of its performance in the aftermath. The role of "emergent groups" following the disaster in the rescue of victims and other forms of assistance became the vehicle for major protest against the government party. The reigning party was only able to recover its hegemony through its manipulation of aid distribution, particularly in the realm of housing in a city in which more than a third of a million people were left homeless by the earthquakes. The article also illustrates the importance of long-term, in-depth acquaintance with local sociocultural and political patterns for the understanding of responses to disaster and aid.

Nancy Yaw Davis' research, as her article amply illustrates, reflects the same commitment to long-term anthropological investigation of pre-impact culture, disaster and aftermath in her study of the 1964 earthquake in two Alaskan native villages. Indeed, her research affords the reader a more than twenty year chronology of the entire spectrum of effects of a major disaster. Noteworthy as well are her findings that disaster and aid were major factors leading to socio-cultural change, particularly in terms of increased contact and integration with the state.

In contrast to the preceding articles in which natural phenomena, earthquakes, impact upon human systems, which

in turn respond in various ways to either mitigate or accentuate destructive effects. By contrast, Susan Lees' paper presents the interesting case of a minor disaster involving a combination of ecological factors, technology and the natural biological process of algae growth to create an agricultural crisis in the Jezreel Valley of Israel. What is impressive in Professor Lees' article is the clear demonstration of how individual and systemic responses in terms of human and technological resources were mobilized to deal with the impact of an artificially created water shortage disaster in agriculture in an arid region. The limited dimensions of this minor disaster permit a greater isolation of contributing factors which larger disasters by their very scope and all-inclusive impacts often do not. The clarity of understanding afforded by Professor Lees' analysis, emphasizing such factors as ideology, technology, environment, human resources and political environment, in both disaster causation and management, is therefore useful and important as a model for disaster research and management in other contexts.

Mohammad Zaman places equal emphasis on the importance of understanding the social context of disaster in his analysis of the role of social relations in response to the disaster of riverbank erosion in Bangladesh. Indeed, he explicitly calls for the adoption of an historical-structural approach in disaster research as opposed to approaches focusing on individual perceptual and behavioral responses. This case study clearly demonstrates how the poor in their efforts to survive are increasingly driven into ever-more vulnerable areas. Zaman's analysis highlights the importance of such socio-cultural factors as kinship, personal networks, patronage, politics and other historical and social structural factors in shaping individual decision-making among limited options in the face of structurally constrained poverty and natural hazard.

William I. Torry explores the relationship between disaster and development in his contribution on drought and desertification in the Western Sudan. Emphasizing that an interaction of both social and natural factors brings about disaster, Torry demonstrates that a mix of such elements as population pressure, fallow curtailment, destruction of tree stocks, borehole drilling, sedentarization of nomadic pastoralists, and naturally recurring drought doom the

Western Sudan to ecological ruin unless drastic preventative measures are undertaken soon. However, disasters also create an impetus and opportunity for development if strategies are well-informed and appropriately designed. Certainly, governments cannot control the climate, but they can develop strategies to deal with its effects. Indeed, Torry explicitly calls for government development projects to factor such ecological threats into their design.

The final offering of this volume is Art Hansen's perspective on the question of natural and social causation in disaster. He makes an explicit call for the study of human agency in disaster research. Hansen begins by discussing the definitions of drought, making clear that it is always interpreted in terms of human needs, rather than some standard of absolute minimum rainfall or watertable level. He also explores the definitional problems involving questions of famine and starvation, laying bare the social factors involved in both. Coupling these issues with the obvious social causation of wars, he then identifies similar attempts at coping and adaptation, such as migration, which are involved in coping with drought, famine and wars in unincorporated and incorporated societies. Developing a theme independently suggested in Davis' article, Hansen advances the thesis that there is no established theoretical reason for separating flood, drought, wars, or incorporation into the capitalist economy in terms of responses by affected populations in the analysis of the general processes of socio-cultural continuity and change.

In summary, it must be noted that all of the articles in this volume of anthropological studies of disaster are based on long-term research and experience in the affected areas described. The studies also are holistically oriented in their analysis of disaster impacts, responses and both short and long-term aid. As anthropologists, all of the contributors to this volume have sought their understanding of disaster and aftermath not solely in the environment or in the society, but in the interplay between those elements through time, both before and after an event. Indeed, such is the nature of disasters that any true understanding of them as they occur in the world must be solidly grounded in research on the context in which they occur. That context is an environment which is both natural and social, and local and systemic, all of which have also both historical

and structural dimensions. This, in effect, means that we cannot be just students of disaster. We must first be students of society and culture.

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DECADES OF DISASTER: PROMISE AND PERFORMANCE IN THE CALLEJóN DE HUAYLAS, PERU

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Perú was rocked by an earthquake in 1970, whose impact is the largest yet recorded in the western hemisphere. With the epicenter located just off the north central coast near the port of Chimbote, a vast region comprising the Department of Ancash and portions of the neighboring areas of La Libertad, Huánuco and Lima was devastated, directly affecting 800,000 persons, killing over 70,000 and injuring 150,000 more. As a result, not only was the physical environment altered, but more importantly, traditional social and administrative institutions were disrupted and profoundly changed as numerous new agencies, regulations, laws and officials managed affairs for a decade.

One of the most severely affected areas was the intermontane valley called the Callejón de Huaylas, in Ancash department about 400 kilometers north of Lima. Located near the middle of the valley, Huaraz, the department capital of Ancash, was almost totally destroyed and about a third of its estimated population of 30,000 thousand killed. A provincial capital, Yungay, was obliterated by an avalanche precipitated by the quake. Virtually all other settlements suffered damages and human casualties. The town of Huaylas at the northern end of the Callójon lost

90% of its buildings and one sixth of its population. Elsewhere in Huaylas district another 200 persons were killed and over 50% of the homes affected. Blocked roads isolated the district for almost a month; irrigation canals were wiped away and filled with debris and power lines destroyed. Along the Pacific coast, desert valleys from Trujillo in the north to Huacho near Lima, were severely impacted as were the highland portions of all the departments adjacent to Ancash.(1)

Widespread social, economic and cultural problems developed in the wake of these events throughout the Callejón and in response, massive amounts of assistance poured into the region developing into the largest relief program and concentrated development effort in Perúvian and perhaps Andean history as well (ORDEZA. 1972). Certainly it was by far the largest investment of capital and infrastructure ever made at one time in the highland area of Perú and the sociocultural and economic impacts of the hundreds of projects attempted continue to unfold as changes mature.(2)

Viewing this process over a 15-year period,(3) an apparent paradox comes to light: communities which in the past which demonstrated substantial initiative and effectiveness seem to have fared less well than ones with undistinguished histories of public accomplishment. One might have predicted the contrary. Why did this happen?

Most concern and research on disaster impact, however, has focused upon immediate response, relief and short-term rehabilitation issues (of Quarantelli, 1978; Green, 1977; Kates et al., 1973; Torry, 1979, 1979a; Barton, 1970). The long-term study of such traumatic events on a significant scale has rarely been attempted (Sheets and Grayson, 1979:4-6). With the background information and post-earthquake observations in hand, the district of Huaylas and its adjacent valley offer an excellent opportunity for such an examination where the effects of the earthquake can be viewed over almost two decades. Various studies show that natural disasters may play major roles in re-orienting a society or in producing long term societal modifications (Torry, 1979a; Sheets and Grayson, 1979; Rees, 1979:290; Noland, 1979:313-328). Studies of this type are, however, infrequent because they require either an archeological

frame of reference or a form of continuous long term observation. Unlike most social sciences, in anthropology the tradition of "re-studies" developed since Lewis' re-examination (1951) of Redfield's (1930) Tepoztlán has been found a useful strategy to explore contexts and results of social and cultural change over a long period. Moreover, this technique permits the examination of the theoretical assumptions and methodological effectiveness; allows the checking of "facts"; and provides a sequel to satisfy the interest in "knowing what happened." The restudy technique can also lead to significant generalizations regarding the strength and direction of cultural processes (Bock, 1980) beyond pointing out the artifacts of our own methodology.

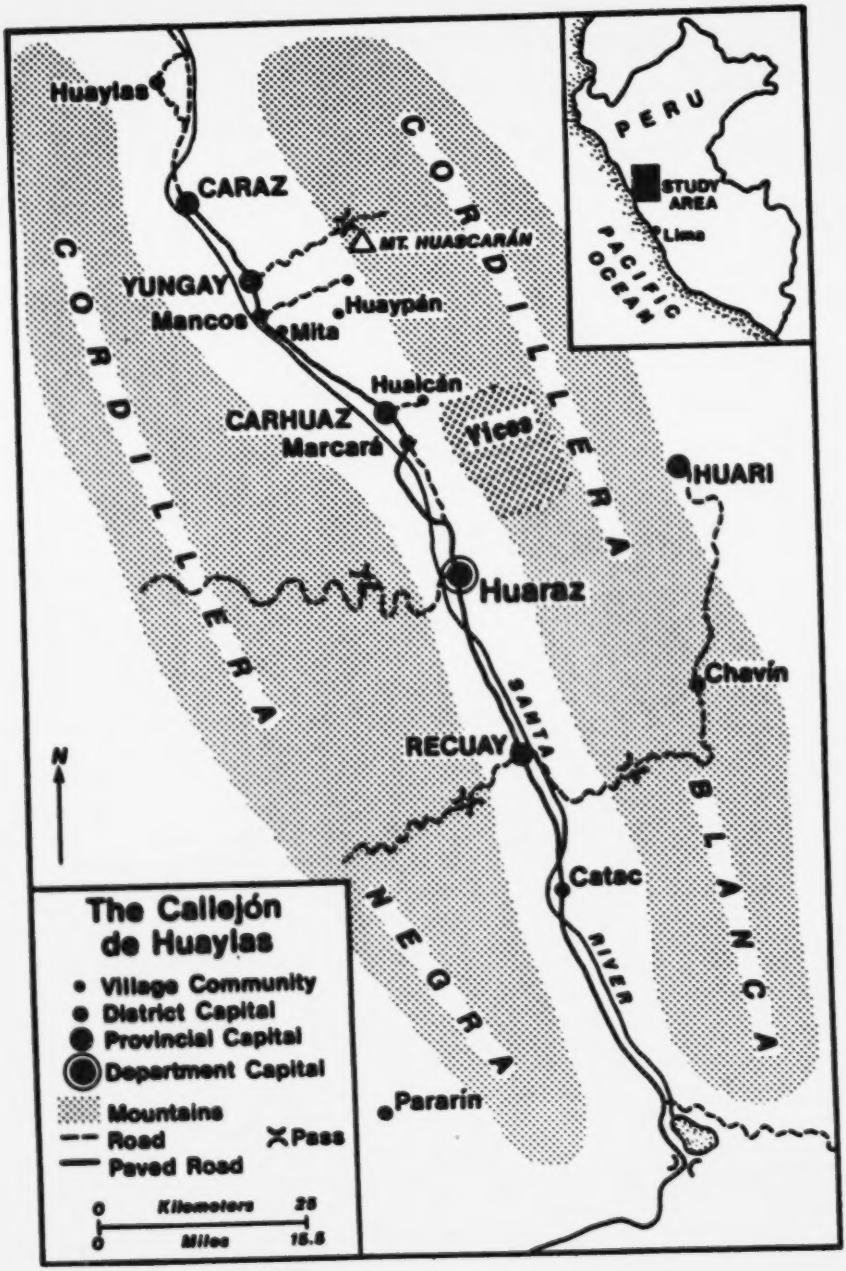
It is axiomatic to propose the examination of social change through the study of items introduced from outside, usually industrial culture sources. Bock's post-Lewis review of Tepoztlán however, reveals the constancy of major socio-cultural structural features, despite the dynamic influence of urban Mexican society. Contrary to what many had thought as a result of the Lewis study which seemed to demonstrate the disintregation of the bucolic rural life described by Redfield 20 years before, Bock now shows how traditional cultural mechanisms have continued to operate in important ways, however unobtrusively (Bock, 1980:141).

In the case of post-disaster Huaylas, a similar process has been unfolding. To understand what happened there after the earthquake, one must not only understand how the Callejón de Huaylas region responded in the aftermath but also how these developments were influenced by the fact that Perú is a country dominated by the overwhelming primacy of Lima (Doughty, 1976; Dietz, 1978; Schaedel, 1979). In Perú, Lima constitutes the "standard" by which all else is measured in the national context: It is the reference point and role model for the nation and thus is emulated by settlements with socio-political aspirations. The institutional and infrastructural features of any given settlement are a function of that settlement's official socio-political ranking. The distribution in Perú of social institutions, wealth and other cultural material is patterned in politically descending order from primate city to village (Dobyns, Doughty and Holmberg, 1966; Doughty, 1979).

If previous conclusions about the importance of hierarchy and primacy in understanding the general distribution of public services and investments are correct, then they should also apply to the actions taken by the government with respect to earthquake recovery.(4) The role of major earthquakes in the life of a nation, particularly in a Third World society, seems not to have claimed the attention of previous research in any special manner despite the fact that it would seem pertinent to place events in such a perspective. Thus for example, in the case of Managua, how the management of the disaster reflected the nature of the political culture of the society seems not to have been raised, thus permitting a sort of acontextual, cross-cultural comparison of reconstruction that tells little of the underlying social processes (Haas, Kates and Bowden, 1977).

Perú has experienced all manner of earthquakes, floods and avalanches affecting all parts of the country. Although there are general accounts of these events, none has been intensely studied until recently.(5) The "casual" attitude towards such dangers may stem from the fact that, historically lacking large-scale resources and external emergency aid, Perúvian communities are technically ill-prepared to deal with disasters, and relief and reconstruction efforts are developed on an ad-hoc basis.

In his attempt to provide a cross-cultural framework for analyzing and predicting disaster response, Roth identifies five variables which determine how people react to natural tragedies: "history, values, technology, centralization and differentiation" (Roth, 1970:445-10). Basing himself to a significant degree, upon those hoary notions by which "gringos" have traditionally stereotyped Latin Americans, he presumes, but does not demonstrate, that Latin American responses to disaster are channeled largely through kin and family systems and away from formal organizations; that government disaster agencies will be "moderately" centralized, paternalistic and assume a controlling role through well-developed interinstitutional connections which reduce interagency conflicts; and that the cultural values emphasize human "subjugation to nature" as opposed to the notion that humans can master nature as is common in the "west." He implies that this constellation of factors might interfere with relief efforts.



After Doughty, 1987

This stereotyping leads Roth to place responsibility for any success in dealing with disaster recovery, largely upon the outside "experts" and government, with the victims' role in the aftermath being essentially passive or negative. As we will see, Perúvian responses to overwhelming "acts of God" were not only significant, but rational in their experiential context not expressing the "fatalism" or passivity his "values" variable suggests. Indeed, it is my premise that successful disaster recovery depends principally upon the efficaciously coordinated actions among those administering outside resources and broad-based local interests, and the incorporation of the latter as a primary and co-equal participant in the decisions and work involved. Failure to do so not only invites program failure, but may harm the society over a long term as well.

The Callejón de Huaylas

The Callejón de Huaylas region has been anthropologically studied since 1949(6) and because of this is one of the best known Andean valleys. Comprised of five provinces and forty one districts(7), the main concentrations of people and settlements are found close to the Santa river which descends rapidly along its 240 kilometer course northward through the valley, from 4,000 meters in altitude to about 1,800 meters in the Cañon del Pato, a spectacular defile where the valley abruptly ends as the waters rush downwards to the Pacific. The Callejón de Huaylas is situated at the foot of Perú's highest Andean range, the Cordillera Blanca, whose many snowpeaks rise to 6,700 meters in a white line along the entire eastern flank of the valley--one of the most stunning panoramas in South America. On the western side of the 20 kilometer-wide valley, the bone dry slopes of the snowless Cordillera Negra reach 5,000 meters.

The valley's productive zones begin in the high grasslands in the southern third, and gradually blend into the potato and high grain fields just south of the capital of Huaraz. North of the departmental capital, maize and vegetable crops occupy the farmers as the land grows warmer and lower in altitude. To the east, glacial waters trickle down from the snowpeaks, while west of the Santa river, the farms of the Cordillera Negra depend upon rain

and the limited waters of reservoirs. The mestizo, Spanish-speaking townspeople dominate the small urban district capitals, made of adobe and tile. The provincial capitals are larger versions of the others, nestled compactly around central plazas adorned with palms and roses.

The dirt road which permitted travelers to reach Huaraz after a rough seven-hour drive from the coastal highway was frequently interrupted in the rainy season by mudslides and bridge problems. In 1970 the department capital of Huaraz was the major city; its 30,000 inhabitants, lived in colonial style dwellings along narrow cobbled streets. As the major market town and administrative center, pedestrians of all social classes crowded through the streets about their business: the urban mestizo middle and upper classes in dark suits, ties, dresses and slacks; the lower class of Quechua Indians and cholos from rural villages wearing brightly embroidered homespuns, woolen ponchos, rubber tire sandals and felt hats. Here and elsewhere in the Callejón the chatter of Spanish was equally mixed with the sounds of the native Quechua.

Throughout the valley, there were few amenities or modern urban services available: only four towns had limited sewerage; five with (allegedly) potable water, and nine had partial electricity. Although the hydroelectric plant at the northern end on the valley in the Cañon de Pato held promise, there had been few significant development efforts aside from the Cornell-Perú Project at Vicos. It was a region whose economy was dominated by haciendas with Quechua serf populations, small farmers and petty markets with artisanal manufactures and basic foodstuffs.

On the eve of the disaster, the mestizo population of Huaylas District numbered an estimated 5,800 persons with about 1,300 in the town. Despite its relative population stability over the previous decades produced by emigration to Lima and Chimbote, local resources were being stretched. In particular the struggle for land and access to water in this mid-altitude (2,900 meters) district of small farmers was intense as frequent litigation and conflicts faced by the irrigation council indicated. Above all else, the people of Huaylas regarded themselves as independent and productive agriculturalists working on their average 2.5 hectares of irrigated land (Doughty, 1968:100-109).

TABLE 1

Provinces and Population in the Callejón de Huaylas, Ancash: 1972-82*

Provinces and Regions	Population 1972	1961-72 % Increase	Population 1981	1971-81 % Increase	Present Urban 1972	1981
Callejon de Huaylas	192,747	.08	213,083	.10	.35	.35
Huaraz Province	85,063	.17	97,167	.14	.44	.46
Huaylas Province**	33,006	.02	34,878	.05	.27	.26
Carhuaz Province	31,374	.11	32,252	.02	.25	.25
Yungay Province**	29,290	.06	32,591	.11	.16	.14
Recuay Province**	15,014	.11	16,195	.08	.36	.45
Ancash Highlands***	285,789	.02	284,819	.00	.41	.26
Ancash Coast****	246,679	.94	320,387	.23	.84	.78
Ancash Total	726,215	.25	818,289	.13	.47	.50

* Derived from Peru, Censo Nacional de Población, 1972: Ancash, Tomo I; Peru, Instituto Nacional de Estadistica, Boletin de Divulgación No. 01-83 Poblacion; and Perú, Censos Nacionales VIII de Población, III deVivenda, 12 Julio 1981, Resultados Definitivos.

** Includes only those districts in the Callejón de Huaylas.

*** There are now, 12 other provinces in Ancash, 2 on the coast and the rest in other highlands areas.

**** More than half of this increase was in the cities of Chimbote,Casma and Huarmey on the Pacific coast which accounted for 69% of the growth in the department. Because of the manner in which census data is reported, it is difficult to disaggregate the data and put it into comparative analytical categories that permit taking into account local variations within provinces. The same is especially true for all the material on post disaster investments.

Politics and Development in Huaylas

Prior to 1970, local district government of Huaylas distinguished itself or its relative effectiveness by securing several desired advances. Over a 40-year period with some external assistance, the people had built two roads totaling over 50 kilometers; several schools, including a small secondary school, and many other projects were completed. In addition, all of the roads, bridges, dams and 150 kilometers of irrigation canals were maintained through a traditional system of public labor. Considering the highland areas of Perú on a national scale, in 1970, Huaylas District was one of:

55% with vehicular roads	33% with electricity
29% with a parish priest	23% with a functioning clinic
18% with a high school	13% with agricultural extension
07% with a state bank	06% with a functioning cooperative

Huaylas district consequently had acquired regional fame and appeared to transcend its status as an obscure, poor and powerless political subdivision of a highland province because it gained services, infrastructure and organizational strength not found usually found in such places.

The district accomplished its goals because of several critical factors: a high level of citizen participation in local affairs reinforced by a strong sense of solidarity, strong district networks of relationships with the centers of power in Lima, and vigorous local leadership which understood how to use the national political system. Traditional political behavior in Perúvian districts and communities involves the constant search for ways to lobby and manipulate key bureaucrats and politicians who control central government policy and decisions in order to obtain support for local projects. Although the favors granted through such efforts seem comparatively small in international terms,(8) they loomed large at the dusty end of serpentine Andean roads. From 1960 to the present 8 persons served as mayors of the district, but during most of that time, one figure was the dominant one, serving for three different periods a total of 17 years. He was thrice elected (1963,

1966 and 1986)(9) taking over 80% of the vote in the district and emerging as the most powerful local level politician in the province even though he was not a resident of Caraz, the provincial capital. Led by this mayor, Huaylinos became skilled at vaulting the bureaucratic hurdles in the power hierarchy.

This attainment was greatly aided by virtue of the mayor's position as a dentist employed by the regional hydroelectric company(10) where he kept up his strategy of developing informal linkages with personages having influence or power in the Lima hierarchy. He sponsored visits to the district during fiesta periods, hosted innumerable parties and lent his own growing expertise to aid the projects in the province. As a dentist, he also earned a wide reputation as a reliable professional and had a clientele drawn from a five-province area. The "Doctu" now had become famous. In 1968 Huaylas district won a national award ("Lampa de Plata") as the district which accomplished the most developmental progress through its own efforts.

There was a dramatic change in government organization and policy with the installation of a military "revolutionary" government in 1968. Under its direction, many far-reaching changes were decreed such as the abolition of serfdom, and major reforms took place in taxation, land tenure, industrial organization and rural peasant community operations (Chaplin, 1976; Cleeves and Scurrah, 1980). Political processes were also frozen and municipal elections not permitted in 1969 as scheduled. Returning to dictatorial practices of the past, the Minister of the interior named all local mayors and councils. In many cases the incumbents were simply kept on in office. In cases such as Huaylas however, where the mayor was considered "politically dangerous," the situation was carefully reviewed by a military commission. Ultimately, the army officials having discussed matters with the mayor and enjoyed a meal at his house prepared by his aging mother, reconfirmed his appointment. Although "normal" conditions of political life were altered by the radically reformist military junta throughout Perú, municipalities like Huaylas sought to pursue their customary strategies in hopes of attracting support for their concerns.

What occurred during the pre-disaster period was that Huaylas had gained greater advantages and access to culturally desired changes than it would theoretically be allotted in the hierarchy of Perúvian political culture (Dobyns, Doughty and Holmberg, 1966:1-26; Robinson and Weldon, 1967). Departures from this rule of ranking and complexity in the Perúvian case are explicable in terms of idiosyncratic features in a particular community which permit alteration in the pattern but which in final analysis conform to it.(11)

At the time of the quake, the nation was still in the early idealistic stages of the military "revolution." For small towns and rural areas, these proposed changes portended great things in theory, but given the long history of pretentious promises of development, chicanery and governmental ineptitude, much of what the military government proclaimed fell upon the ears of a highly alienated and skeptical population. Thus, government agencies sought to kindle positive support through a media-wise propaganda blitz unequalled in Perúvian history to that time. Posters, pamphlets and broadsides proclaimed: "Land for those who work it," "Peasant - No more tears," and "You have a right to justice - no more slick lawyers, deceitful judges and notarized redtape." Such messages struck home and nourished hopes that at least some of the promises would be fulfilled. By the early months of 1970, the military image was high, its powers of governance unchallenged, and the public viewed the military officers cum ministerial employees as technically competent in contrast to their civilian predecessors. What "better" circumstances in which to manage even so frightful an experience as the 1970 earthquake? If anyone could handle it, this government could.

The Earthquake: May 31, 1970

The Perúvian earthquake and landslides of 1970 in the Callejón de Huaylas were devastating but not unique in the experience of many residents. Since 1940 there have been 16 major earthquakes in Perú, four of them in Ancash. Geologic faults and the precipitous character of the valley have created a landscape strewn with house-sized boulders and flood-washed bottom lands. The region also suffered

from 4 avalanches in this same period (Perú, 1969:178-179) (Carrion Vergara, 1962):

Huaraz, 1941. The capital of the department lay sleeping in the dawn of December 13, 1941 when an avalanche of ice and rock and water swept through part of the city, killing 5,000 persons. The same thing is reported to have occurred in 1702 at the same site. Since 1941, a part of the avalanche area had been given over to a well-to-do housing development, despite constantly expressed, although minor, preoccupation over a repetition of the disaster.

Chavin, 1945. The famous Early Horizon ruins of Chavin and portions of the contemporary village were covered by avalanche of mud and stone.

Pallasca and Pomabamba, 1946. These provinces in northernmost Ancash were heavily shaken on November 10, destroying several towns, including Sihuas (later to become a provincial capital) and villages such as Acobamba. Almost 1400 persons perished in all. As a result, the village of Acobamba voluntarily moved itself to a new location, two kilometers from its old site.

Cañon del Pato, 1950. A glacial lake burst its natural dam at Los Cedros, rushed over the hydroelectric construction project at Huallanca, destroying the work that had been done, delaying completion of the project for six years.

Carhuaz, 1956. Tremors shook the province of Carhuaz, causing minor damage to buildings, particularly in the capital city.

Ranrahirca, 1962. Heavy rains and geologic weaknesses produced a mammoth avalanche which fell from Mt. Huascarán, Perú's tallest mountain. It obliterated several villages, including the district capital of Ranrahirca and washed out the bridges over the Santa river all the way to the coast at Chimbote, a hundred miles away. About 4,000 persons were killed. The remnant popula-

tion was resettled in the area immediately adjacent to the mile-wide avalanche. By 1970, a few public buildings had been raised with international help, and some new houses were in evidence along the hundreds of yards of new concrete sidewalk which checkered the planned resettlement area. Constant scandals and resident complaints accompanied the reconstruction process which never reached a conclusion.

Recuay, Huarmey and Pararin, 1963. A wide area of the arid western Andean slope (Cordillera Negra) was shaken by a strong earthquake on September 24. Public buildings were damaged in several small isolated towns. The Perúvian government sent in immediate aid by helicopter and dispatched field teams to aid in the reconstruction as needed.

In these and other disasters there was little recovery assistance available, although relief aid was occasionally been received in small amounts from the government and the church. The spectacular Ranrahirca disaster in 1962 however, brought extensive international attention (McDowell, 1962) and assistance. Historically, Perúvians gained solace largely through their Roman Catholic faith with many towns having patronal saints and celebrations dedicated to the mitigation of earthquake effects such as the Lord of the Tremors (Señor de los Temblores), Patron of Cuzco; the Lord of the Sea (El Señor del Mar) Patron of the port of Callao) revered since the seaquake of 1746; and, the biggest national cult of all, The Lord of Miracles (El Señor de Los Milagros) which began after the Lima earthquake of 1647. The latter is widely revered throughout Perú and indeed, is the Patron of several villages in the Callejón de Huaylas.

The people in the Callejón de Huaylas are well aware of the perils of living there and respond to them in various ways: through religious observances and ritual behaviors, and through pragmatic steps to meet the perceived needs. Thus, after the 1970 disaster, patron saints, the symbolic protectors of community life, were fervently worshipped and religious accouterments carefully rescued from the debris of disaster to be stored in hastily constructed shrines. At the

same time, people modified their houses and settlements to achieve greater safety: walls became thicker, ceilings and roofs lowered and constructed of lighter weight material and streets were often dramatically widened. Instead of entirely explaining the cataclysm as a punishment from God however, many persons fixed responsibility for it on the French government for their recent atomic bomb tests in the South Pacific and the United States' atomic tests at Amchatka, Alaska. Despite such "folk" responses to catastrophe and the "fatalism" which may be implied by some of these actions, the elaboration of belief and appeal to supernatural forces does not preclude other explanation or action, Roth's stereotype of "latin" fatalism notwithstanding.

First the Earthquake, then the Disaster

It was Pitrim Sorokin who long ago postulated "the 'law of Diversification and Polarization' which, simply put, states that disaster brings out the very best and the very worst in people; it exaggerates what is already there" (quoted in Dirks, 1980:22). The people of Huaylas, living up to their past reputation, illustrated the point rather well and certainly were not dominated by "culturally determined" Latin American fatalism. In the first week of the disaster:

> +The mayor who had been in Lima, talked his way onto a helicopter, convincing the pilot to take him to Huaylas the day after the quake to evacuate victims.
>
> +The Huaylas migrants colony in Lima had organized an extensive collection of food, clothing and money through its several clubs and dispatched this aid over the mountain trails from the coast on the backs of youthful volunteers who arrived in Huaylas three days after the earthquake.
>
> +In Huaylas, a task force of 1,000 persons cleared a rough landing strip amongst the corn and wheat fields where small craft(12) landings were made bringing assistance and evacuating the injured. Construction of the Huaylas "airport" was the only such event to occur in the valley. The

operation was closed down after ten days however because the national airport authority (CORPAC) hadn't approved it.

+The municipal government and its Emergency Committee conducted a complete, district-wide census and needs assessment in order to provide a basis for the distribution of relief supplies.

+Work teams from each of the district's barrios had begun clearing the main 17 kilometer access road and the 34 kilometer road to the hydro-electric plant by hand.

+Under the leadership of local school teachers, children and parents began clearing school sites and recovering classroom materials; farmers were rebuilding and cleaning irrigation canals.

Families had, of course, begun recovering their possessions and building emergency shelters at once. Government assistance arrived with the first helicopter and plane landings and emergency aid flowed in once the road had become passable in about a week. During the next three months in Huaylas (and elsewhere as well), the initiative shifted from the hands of local persons and authorities to increasingly dependent relationships with outsiders of various affiliations: first U.S. Peace Corps volunteers and Perúvian military officials, then four Dutch male engineers and a team of Russian medics(13) and soon, a plethora of government employees representing various agencies joined this parade of erstwhile experts and administrators imposing their authority over the Huaylas municipality as they had elsewhere.

The 1970 earthquake thus disrupted and spoiled the socio-political linkages which had permitted Huaylas to transcend its district status in development terms. In addition to the political changes already made under the military "revolutionary" government which altered the political personae, policy and operations, a new all powerful bureaucratic institution was created to deal with the disaster -- The Commission for the Reconstruction and Rehabilitation of the Affected Zone (CRYRZA); later renamed in 1972, The Regional Organism for the Develop-

ment of the Affected Zone (ORDEZA); in 1978, The Regional Organism for the Development of the North (ORDENOR); and since 1982, called the Corporation for the Development of Ancash (CORDEANCASH). This bureaucracy paralyzed traditional adaptive political relationships and ironically produced the effect of "revitalizing" the official formal hierarchical structure, long obscured by "informal" arrangements which by passed its many layers. Thus the underlying formal nature of the national society was reasserted and Huaylas had to compete anew at the same level as all the other districts, subordinate, in turn, to provincial capitals and these in turn to the departmental capital.

Known by its almost unpronounceable acronym, CRYRZA was to administer the assistance and coordinate the activities of the various ministries, programs and private voluntary agencies. Affiliated with it were others with equally bewildering alphabetic names that were mostly new to the region: JAN, SINAMOS, ORAMS, ONDECOOP, CARITAS, OFASA, CARE, AID, PNUD, NECS, PID, and OCA,(14) to note but a few of the national, international and non-governmental agencies which controlled, advised, planned and administered various programs and projects. Further complicating matters was not only the way in which responsibilities were divided for administering the types of assistance (agriculture, welfare, housing etc.) but also particular provincial sub-areas were assigned to certain PVO and even some Perúvian government agencies such as SINAMOS as their specific zones of operation and responsibility.(15) This led to local confusion about who was in charge and had the power to decide policy, where relief goods were coming from and what was to be done. Moreover, there was strong competition amongst the "relief-givers" and meetings among members of the Council of Voluntary Agencies in Lima often produced disputes and demonstrations of jealousy.(16)

As the cadres of representatives fanned out across the mountainsides delivering assistance as well as promises and conflicting information while making endless demands on local populations, this bureaucratic alphabet soup frustrated and confused even the most sophisticated persons. The expert visitors to communities, while generally staying but a few minutes or hours, invariably expected to be treated to food and drink and be personally attended by local authori-

TABLE 2

International Disaster Assistance to Peru
1970*

Sixty Eight Nations' Contributions	Amounts
International Relief Organizations	$17,471,990
United States Emergency Relief	3,150,000
U.S.: Rehabilitaiton Projects	7,400,000
U.S.: 27.8 Tons PL 480 "Food for Peace"	5,891,000
U.S. Private Voluntary Agencies	10,355,446
Total Foreign Assistance	$44,268,436

*Source: A.I.D. 1971 (in dollars)

TABLE 3

CRYRZA Budget Attributes, 1971-2*

Budget Organization	Amounts	Percent
Peruvian Sources	$49,104,161	.904
Foreign Contributions 1971-71	5,230,335	.096
Total CRYRZA Budget, 1971-72	$54,334,496	1.00
Amount Administered by CRYRZA	10,323,554	.19
Administered by Other Government Agencies	43,900,942	.81
Direct Administrative Costs @ .0225	$ 1,222,526	.0225

*Source:
ORDEZA, nd (in dollars @ 38.7 soles)

ties. Thus the ability to entreat and cater to the visitors was regarded as essential to obtaining significant assistance or project approval, and indeed often proved to be a critical variable (Oliver-Smith, 1986:223-229). Villages which did not have these capabilities felt themselves disadvantaged in the struggle for attention and assistance. Squadrons of newly appointed officials ranged the countryside, experts and engineers popped up in most district capitals and heavy-handed regional administrators bossed local authorities around. These outsiders were difficult and unreliable, often giving conflicting counsel while accepting hospitality without responding positively to requests. The spectacle of otherwise dignified persons virtually grovelling in the presence of these supposedly awesome personages was at times an embarrassing or tragi-comic episode, typically played out in the shadows of ruined buildings and decrepit homes. Rarely did agency officials come to learn or listen, rather, the fleeting moments of contact with villagers were occasions for giving instructions and advising the locals of impending actions. The following amply illustrates the character of these encounters.

> The General's caravan of official vehicles (jeeps and vans) finally arrived in the Huaylas plaza some two and a half hours late. The elaborate country dinner prepared for the director of CRYRZA and his entourage of about 20 persons (plus drivers) riding in 5 vehicles had long since begun to cool and the Huaylinos were very upset. On arrival, the mayor stepped forward to greet the General but was given a perfunctory handshake and then upbraided in an insulting manner because the caravan had become lost en route to Huaylas. It seems that the General's car had taken the only wrong turn possible and led the caravan into the Cañon del Pato, along the dangerous, narrow and avalanche-blocked road to Huallanca and couldn't turn around! Almost a Keystone Cops-like episode. Thus the General and his band of bureaucrats were furious that no one was waiting along the road (20 miles out of town) to advise them. Why, after almost a year as director of CRYRZA, the General and his staff didn't know the way along the only road open at this end of the valley, defies explanation. The

> visitors, all wearing hard-hats to protect themselves from imagined dangers, then paraded around the plaza, walked up the (main) street and after about a half an hour announced that they were leaving and wouldn't eat what they referred to as the "rustic meal." The Huaylinos were besides themselves with both anger and anxiety, feeling that this would be fatal to their hopes for assistance. Insisting that the General at least join them in a beer before going back to the department capital, they produced several boxes of the beverage. The General told his staff to take the boxes with them and they left with nary one being opened. (Field Notes, PLD. 7/71)

With episodes like this commonplace throughout the valley, there was a rising sense of skepticism about the government and its competence. Such experiences in the first year after the quake also dampened local enthusiasm to work and take significant initiatives. Government-contracted bulldozers and trucks had generally cleared debris from the streets throughout the Callejón by the end of 1971. In Huaylas the machinery not only did this but also arbitrarily destroyed many of the remaining sound buildings and the colonial church which had only lost its roof. Throughout the valley the complaints about similar incidents were common and vociferous (Trinidad and Añi, 1972). The streets were widened as the bulldozers plowed remains to one side creating huge mounds as homeowners scrambled to recover their buried possessions. Callous machine operators frequently smashed the precious remains of household belongings and reusable beams, stone, doors and windows were crushed or simply dumped into the ravine at the edge of town. In the values of thrifty peasant-townspeople, such a waste was anathema and the whole experience is bitterly remembered today. Throughout the Callejón, such events gave rise to the saying, "first the earthquake, then the disaster" (Oliver-Smith, 1986:106).

The population of Huaylas in both rural and urban areas was housed in barracks, Sears Roebuck tents and makeshift shelters at the periphery of their former settlements for over two years before any significant new housing was developed. At the end of 1971, the Organization of American States (OAS) offered to build 80 houses in Huaylas

district. These were standardized four room structures to be erected under the aegis of CRYRZA on the basis of "greatest need." Although the houses were designed for urban use, CRYRZA would not allow any modifications to suit local use patterns of the farming population. Because the families insisted on their rights to build as suited their tastes, CRYRZA authorities suddenly announced that as a punishment for being "stubborn," the houses would be placed in the neighboring district of Pueblo Libre. The OAS representative intervened, however, and agreed to let the Huaylinos build the houses according to their needs. Nevertheless, at the insistence of CRYRZA, only forty houses were built in Huaylas with the rest going to the other district.

The urban planning saga was to prove an even more intractable dilemma for Huaylas. As the sixth largest town in the valley and a district capital, Huaylas was classified as a "city" and thus fell subject to the new planning and zoning regulations established by CRYRZA. In theory, before new buildings could be erected and other urban improvements made, the "regulating plan" had to be approved by CRYRZA authorities in Huaraz. This caused serious problems in many places for it was through this mechanism that the agency attempted to force the relocation of several towns, precipitating numerous internal conflicts in communities.(17) In Huaylas, as elsewhere, many of the CRYRZA "experts" who came to direct events also revealed themselves as incompetents.

> My compadre, don Filemón said that the urban planners were coming this a.m. from Caraz to tell the municipal council what they had decided about the much-awaited redevelopment of the town. Accordingly we went to the improvised city hall when they came and along with the council members, the Dutch volunteers (civil engineers), the mayor and others, the "urban planners" spoke to us. Their leader, a young woman calling herself a "doctor sociologist," announced that since "no one knew anything about Huaylas, there never having been a study here before" (with me sitting in the crowd!!, the Dutch engineers there too, not to mention the experienced Huaylinos themselves) she would do the research that

> morning and others would measure the streets to discover local needs! The Huaylinos began laughing whereupon she scolded them, using the second person form of address as if she were speaking to children -- or social inferiors. Don Alberto interrupted her saying she didn't understand what was going on, and that the Huaylinos were perfectly aware of their needs and didn't need to be insulted. The "planners" from PNUD were non-plussed. The meeting ended after Fiti (the mayor) intervened and gracefully redirected the discussion. That afternoon the "planners" left but no one knows what they intend to do about approving permits for reconstruction. (Field Notes, PLD, 7/71)

Although several attempts were made to "get close" to the general who headed the redevelopment organization by approaching his brother who had been taught by two Huaylinos who ran a private school in Lima, the plan failed. Huaylinos appraised their problem succinctly: "No tenemos militares huaylinos, carajo!" ("we don't have any Huaylas military men, damnit!")(18) The first years of the post-disaster period were a second catastrophe for Huaylas: "those lousy bureaucrats from Lima and shameless militares treated us like dirt!" as one council member summed it up. By 1978, Huaylas showed the signs of their lack of success in dealing with the redevelopment agency located at the other end of the valley. Rubble still remained in ever more compacted mounds and the initiative which first distinguished the Huaylas response to the disaster was largely suppressed and confined to minor individual efforts to improve housing. As an officially designated "urban center" the town still could not be rebuilt without first having an urban development plan (plano regulador) approved by the central agency for redevelopment.

By 1978, five urban plans had been submitted by municipal officials but none was approved with the result that families were very tentative about rebuilding their homes in permanent fashion for fear that ORDEZA might order their removal. The municipal council, now headed by another mayor, functioned in a dispirited manner and district morale was as low as complaints were high. In addition, farm production was down and apparently declining

abetted by a drought, emigration had increased and in general, the community sense of solidarity was weakened.

Research conducted in the immediate post-disaster period did not show this trend at first as noted above. Indeed, first responses to the tragedy led to the prediction that of all the places so affected, Huaylas would be among the best able to make a recovery because of its institutional strengths and past experience. It was even suggested that the disaster, however bad its immediate effects, offered an opportunity for positive change and development in the region (Doughty, 1971), a situation also experienced elsewhere (Rees, 1979:290). Eight years later this prediction seemed wrong despite the importance of such pre-disaster conditions for recovery and response capabilities often stressed in research (Wenger, 1977:18-24). Moreover, despite the fact that I had considered Huaylas' development in both regional and national contexts (Doughty, 1963; 1968) I failed to examine how the mechanisms of linkage could be interrupted by major, if temporary, structural and environmental changes. Huaylas' historic success in promoting its own development was not sufficient to predict what had actually happened.

The last time I visited Huaylas in 1983, there was still no approved plan for urban redevelopment, although the impatient townspeople had "illegally" gone ahead in building their homes without further guidance from the agency, by now called CORDEANCASH. The agency, however, had permitted the construction of a new municipality building, church, and installation of a potable water system.(19)

Elsewhere in the Callejón de Huaylas, events unfolded following the "rule of primate city dominance" and centralization. CRYRZA was headquartered in Lima for the first year and a half after the quake. During this time, highland districts struggled to communicate with the military directors of operations, all of whom were unfamiliar with the region and made little effort to learn about it.(20) In December, 1971 CRYRZA headquarters was moved to Huaraz,(21) an event heralded in that city like the Second Coming as announcements of position openings filled the local newspaper offering "permanent employment" in government ranks (Diario de Huaraz, 19 XI 71-13 XII 71). Virtually all of the jobs announced required clerical and technical skills not readily found in the region with the

result that most of the employees came from other areas of Perú. The administrative complex built on the outskirts of Huaraz at Vichay had more that 1800 employees at its zenith (1974-80) and had a direct impact upon the departmental capital, Huaraz. The city has been totally reconstructed, and is now endowed with a vast bureaucratic structure and a significant new population.

Throughout the central and northern portions of the valley signs of redevelopment appeared, but the most significant infrastructural investment has been the paved highway. This road stretches from the coast through the provincial capitals along the valley bottom, stopping about a quarter of the way from the northern end at the provincial capital of Caraz. While it was at first thought that the new "modern" airport near Huaraz would create the most impact upon its completion in 1977, the highway quickly came to the fore. For the first time, tourists arrived in droves, stimulating a boom in hotel and restaurant businesses along its length. From touristic oblivion, the Callejón was now "an attraction," especially for Perúvian tourists who could afford the low rates charged in the region and did not demand "international class" accommodations.(22)

Off the pavement, however, settlements have again assumed their traditional appearance, although most still show obvious signs of the disaster. Indeed, contrary to the model of redevelopment suggested by Kates and Pijawka (1977:1-23), Perúvian planners seem to have inverted the recovery process to some degree. The clearance of rubble took place during the first year and a half as might be predicted by the "pace of recovery" theory, but the construction of monuments and special edifices preceded the completion of housing projects, unlike the cases analyzed by those authors. Thus, civic centers and municipal halls were high on the priority list for construction projects in all district and provincial seats where damage occurred. Monuments were also erected Huaraz in honor to the Soviet airmen killed in a plane crash while delivering relief aid, and the workers of ORDEZA had several plaques set into buildings praising the work of that agency. The most self-serving monuments however were the two little "parks" in Caraz and Yungay made the Perúvian army engineering battalion (Batallón Huascarán) featuring heroic center pieces

in praise of themselves. In the meantime, a bridge the battalion constructed over the Santa River at Shupluy in 1978, was declared unsafe in 1980, and a monument they began in 1976 to the avalanche victims at Yungay was still incomplete in 1983!

As of 1982-3 there were significant numbers of families still living in the "temporary" relief housing in the cities of Caraz and Huaraz and other places throughout the valley with many of the styrofoam "igloos," pressed-board barracks and even tents continuing to house a second generation of residents. On the other hand, the 'monumental center' of Huaraz designed by ORDEZA engineers was half-finished by 1978 yet in 1980 local citizens had mustered enough political strength to thwart the further construction of several civic buildings including the cathedral, because of their non-traditional designs. By 1983, the partially constructed cathedral was being torn down and the plaza area replanned. Similarly in Yungay, the misplaced band shell in the center of the plaza, finished by 1976, (Oliver-Smith, 1986:257-259) was angrily demolished by residents in 1986. In Huaylas, the first and only building reconstructed by the ORDEZA (the civic center in 1976) was derogatorily referred to as the "Supe fish market."(23)

Post Disaster Population Dynamics

Significant changes occurred in the post disaster period with respect to population and it appears that the earthquake recovery policies played an important role in these. Comparative studies indicate that under twentieth century population conditions, places suffering population losses of over 20% may take as long as 20 years to recuperate their pre-disaster size (Kates and Pijawka, 1978:16-17). In Huaraz the loss was over 30% and Yungay lost 92% of its inhabitants. Nevertheless, although there was a significant loss of life in the region, only Yungay Province registered a population decline two years after the disaster and Huaraz had substantially increased in size, continuing its growth trend in a manner that separated it sharply from the rest of the region, demonstrating the force of the "disaster boom economy" created by the presence of the redevelopment agency headquarters there (Dudasik, 1980). Migration filled

the void by providing eager replacements, attracted to the economic opportunities which erupted in the wake of disaster evidenced by the continued growth of the coastal region of the department which was also devastated, but which received the major portion of disaster resistance.(24)

Examination of the 1981 census also reveals that population, not surprisingly, has flowed in the direction of employment and investment of redevelopment monies and that the migrants were largely male as reflected in the sex ratios for the districts (Perú, 1983; Perú, 1984:76-84). Thus, the demographic effects of the earthquake recovery effort seem to have followed previous trends by promoting migration out of rural areas and small towns, the settlements which received the smallest amounts, proportionately, of both short and long term assistance. Nevertheless, no startling shifts occurred in the overall pattern of population as distributed among the provinces as such. In Huaylas district the population dropped to below 5,000 for the first time since the mid-1930s as the result of migration. In addition, Huaylas showed a 41.5% drop in its yearly birth rates by 1980, a trend which accelerated rapidly after the disaster.

The spectacular growth of Huaraz featured the complete reconstruction of the central part of the city and over one thousand houses, in addition to the CRYRZA administrative complex of thirty buildings on the outskirts of the city. The 1800 well-paid employees of the agency and their ministerial counterparts as new residents added substantially to the financial upswing in the Huaraz provincial economy. By 1981, Huaraz (45,000 population) the departmental capital was thirty-three percent larger than it had been at the time of the quake, a rate of growth over three times greater than the regional average and even more than the urban coast which attracts large numbers of migrants. Huaraz was now a "modern" city, with an enormous daily market (Babb, 1985:56) with over 1600 vendors, eighty percent of whom are women. The entrepreneurial force of this post-quake development abetted by the paved highway(25) marks a major change in the focus of the valley's economy that clearly was not contemplated by the planners of the "new" Huaraz. The growth of the formal business sector has also been considerable and along the renovated Avenida Fitzcarraldo with its topiaries lining

the center traffic divider. Nothing resembles the commercial aspects of the old city.

The enormous amounts of money for reconstruction and development after the earthquake far surpassed anything heretofore budgeted for all highland development and certainly more than for any particular region per se (Tables 2-4). The increase in funds available to the region was spectacular: from the 1968-70 biennium, funds increased 1468% (Table 4) for 1971-1972! Although a substantial amount derived from initial response emergency assistance, most of the funding ultimately came from multilateral international sources, USAID and Perú itself. Considering the national context and events of the time, this gargantuan investment of scarce development funds must surely have created significant impacts upon the rest of the national economy, policy and programs considering the fact that in 1970 for example, Perú's foreign reserves were 338 million dollars (World Bank, 1982:138) and pressure to invest resources in the many reforms was very great at that time (Lowenthal, 1975). As Perú's largest single development supporter, USAID budgets for the entire country program have rarely exceeded 90 million dollars annually and at the time of the earthquake, were less than 20 million. Nevertheless, one searches in vain for any treatment of the impact of this huge disaster on Perú's economy or politics (cf. Lowenthal, 1975; Gorman, 1982; McClintock and Lowenthal, 1983). Among the many questions raised is the ability of Perú to absorb and use such massive funding efficiently over a short period of time. Evidence in hand is negative on this point.(26)

The redevelopment phases took on the aura of typical (but extraordinarily large) development assistance programs in many ways although with the major difference being that the program was headquartered, not in Lima, but in the heart of the beneficiary region where benefits accrued in greater degree to those with greatest proximity to the center of operations, either physically or in terms of hierarchy. One receives some idea of this pattern wherein the adjacent Provinces of Huaraz and Recuay with 50% of the population received 60% of the communal projects monies. Most of the funds however, were channelled

TABLE 4

Government Relief, Recovery and Development
Investments in Ancash, 1968-1980*

1968-1970	(38.7)	$ 252,609
1971-1972	(38.7)	368,356,821
1973-1974	(43.7)	57,554,919
1975-1976	(45.0)	75,424,044
1977	(65.0)	135,126,215
1978	(169.0)	258,829,786
1979	(239.7)	54,651,960
1980	(317.0)	33,823,309
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Totals		$725,893,448

Source:

* Oficina Regional de Planificación, "Sintesis de las Principales Acciones del Gobierno Revolucionario de la Fuerza Armada en el Periodo 1968-1980, Departamento de Ancash." Huaraz, Julio de 1980, p. 25.

** Exchange rates are number of soles to the dollar. Amounts expressed in dollars.

TABLE 5

Inventory of Projects Implemented by CRYRZA and Successors, 1971-1979
By Districts and Provinces in the
Callejon de Huaylas*

Province	Total Projects	Percent
Carhuaz	121	.14
Huaraz	390	.45
Huaylas	157	.18
Recuay	76	.09
Yungay	120	.14
Total (48% of all projects)	864	1.00
Total Projects All Areas)	1,768	1.00

Source:

* "Inventario de Proyectos Ejecutados por CRYRZA, ORDEZA y ORDENOR-CENTRO, 1971-79, Oficina Regional de Planificacion, CORDEANCASH, Huaraz. Does not include Ministerial projects.

through general programs whose emphases centered on Huaraz and to a lesser degree, the provincial capitals.

The return of "normalcy" in business, farming and general life apparently had little to do with the redevelopment agencies. Aside from the significant housing projects in Huaraz and Yungay (and in the coastal cities), most family quarters were rebuilt with minimum if any aid from outside sources.(27) Schools which had been traditionally built entirely from community resources in the past, were rebuilt with recovery funds in most districts, with local people providing free labor. Eight years after the earthquake, many communities were still completing their schools, or waiting for funds to do so, as was the case in Huaylas. Despite continued efforts to initiate programs, Huaylas remained in the shadows of the larger development efforts which could be seen in the southern portions of the Callejón and in 1980, the town (like other district capitals in the province) still had a "raw" and dusty quality that was most discomfiting. The first break in this depression came in 1979 when, through the efforts of the Huaylas District Association in Lima, the German Bishops' Fund awarded Huaylas a sum of money and materials to begin construction on a new church. Shortly thereafter, Huaylinos discovered that a key new engineer at ORDENOR was a Huaylino who was quickly approached by the mayor and enlisted to help design the church.

The situation changed for several reasons, primarily because development agency funds were on the decline and a civilian government took power, initiating the inevitable bureaucratic changes that accompany all transfers of power in Perú. The thermidorian qualities of these processes quickly became evident as the new civilian leadership in ORDENOR proved more approachable and the former Huaylas mayor took up his duties as a member of the newly elected parliament. Now Huaylinos claimed they would finish their "mother church" before Huaraz did; a microwave relay was set up on the mountain so that television could be seen; the plaza was partially paved; the clinic was operating with a resident doctor (intern); and the new schools were finally finished. In municipal affairs, barrio work-parties resumed their accustomed patterns of voluntary work days to repair local roads, bridges and other infrastructure. Thus, by 1983, the old political culture had finally re-emerged from its

decade of latency when it was eclipsed by the bureaucratic and autocratic powers of the reconstruction agency.

Summary

Although the disaster and recovery efforts produced some significant new infrastructure and led to dramatic changes in the size and role of the departmental capital, there were no major alterations in the patterns of socio-cultural behavior readily discernable over the 15 year period. The post-disaster activity, where it departed from pre-event norms, returned to its traditional mode in a decade, facilitated by the reinstitution of civilian government. This process was an arduous one because the organizational effects of recovery under the control of CRYRZA and its successors was to weaken local institutions in districts such as Huaylas by blocking many local initiatives, usurping responsibility and decision-making powers, and displacing leadership and labor inputs. As a result, numerous major infrastructural investments throughout the valley were either wasted or ineffective because of poor planning and research, and because of the failure of redevelopment officials to consult with the beneficiaries.

In more general terms, the pattern of post-disaster recovery did not follow that outlined from previous disaster studies which showed the initiation and completion of primary needs before the erection of monumental structures and memorials. By the same token, the Perúvians did not follow the hypothesized pattern of "Latin American fatalism" predicted by some as a response to the disaster, but rather, communities and individuals acted in pragmatic and reasonable ways to meet their needs as they saw them. In the case of Huaylas, discouragement and relative inactivity appeared when the redevelopment agencies proved inattentive, unreliable or incompetent.

Another important effect of the long experience was that it reinforced existing patterns of population trends in the valley and with regards to urbanization. Migrants continued to leave the highlands for the coast in significant numbers; the major regional cities grew at the expense of small ones; people were attracted towards the foci of investments made by the redevelopment programs. In these respects, the departmental capital grew dramatically,

developing as a regional primate center, much like Lima's role is to the nation as a whole. Investments on the other hand, focussed on infrastructure and not human resources. Rather than train local populations, the redevelopment effort drew upon outsiders to provide much of the technical and managerial skill.

Of the many specific, general and theoretical recommendations and insights one might draw from this decade of tragedy, the most trenchant ones are neither novel nor surprising because they reaffirm old principles of community development and the importance of local participation and empowerment. Relief agencies with few exceptions failed to use such guidelines in their activities and in many cases deepened the effects of disaster. Only when the bureaucratic power of the redevelopment organization weakened, did Thermidor begin.

NOTES

1. The region impacted is approximately 54,000 square kilometers (20,000 square miles) in size, somewhat larger than Costa Rica and more that 2.5 times the area of El Salvador. Because of the diverse and large area affected by the earthquake, I will focus upon the events and processes in the Callejón de Huaylas, and particularly in the district of Huaylas at its northern end for analysis. The population is analyzed in Table 1.

2. Despite the scale of this disaster and the involvement of dozens of international agencies and governments, funding agencies showed little or no interest in sponsoring commensurate field studies or large scale analyses of the disaster or its impacts or evaluations of projects undertaken. The principal research was underwritten by doctoral dissertation grants (Oliver-

Smith, 1974, 1977, 1979, 1986; Bode, 1974, 1977; Dudasik, 1976, 1978, 1980) or short term foundation or self funding (Doughty, 1971, 1971a, 1973, 1979, 1980; Montoya 1970).

3. Data for this paper were obtained through field work beginning in 1960. Since that time I have returned to the Callejón de Huaylas 14 times, most recently in 1983. I surveyed the area three weeks after the earthquake in 1970 to assist in relief efforts as consultant to USAID and the Council of Voluntary Agencies and to administer funds collected by the ad-hoc Perú Earthquake Relief Committee, returning again in 1971 for the same purpose. Other research visits were made in five other years. The post-1970 research was supported by the Wenner Gren Foundation, a Faculty Development Grant and sabbatical leave from the University of Florida and, from personal funds. I want to thank my wife Polly French Doughty and son Thomas for their invaluable field assistance in 1980 while in Huaylas. Portions of this article were presented in papers delivered at the annual meetings of the American Anthropological Association (1971, 1972, 1983) and the Society for Applied Anthropology (1980).

4. Such a determination would be not only valuable in interpreting socio-political change in general, but also the reasons for the shortcomings perceived in other government programs (Palmer, 1981; Cleaves and Scurrah, 1980; McClintock and Lowenthal, 1983).

5. The 1970 earthquake, however, has prompted more concern in this regard and led to some summary reviews of Perú's vulnerability to earthquakes if not other natural cataclysms (cf. Giesecke and Silgado, 1981; Rivera Palomino, 1983).

6. The first studies of the region were done in conjunction with the Cornell-Perú Project at the community of Vicos in Marcará District (Vazquez, 1952; Holmberg, 1960; Mangin, 1955; Ghersi, 1959). Research in other areas of the valley include studies of Yungay Province (Robinson and Weldon, 1967; Oliver-Smith, 1974; Vazquez, 1969); Mancos District (Fischel, 1971) and Huaylas District (Doughty, 1968). For a fuller descrip-

tion of regional life prior to the earthquake, see Oliver-Smith (1986:31-74); Doughty (1986). The Cornell-Perú Project is described and updated in Doughty (1987).

7. The Perúvian political and administrative units in descending order of importance are departments, provinces and districts. The department is governed by an appointed prefect; the province by an appointed sub-prefect and an elected mayor and provincial council located in the provincial seat; and the district, by an appointed governor and an elected mayor and council located in the district capital. Below this level there are barrios, hamlets, and neighborhoods, governed by appointed lieutenant governors and municipal agents. In some cases there also are locally chosen leaders of different types. There may also be within a district or over lapping several, an officially recognized Peasant Community or other type of common land-holding unit which independently elects its own governing board and leaders.

8. The largest "grant" thus obtained was worth about $5000, and most assistance received in unit terms was probably about $500 on the average.

9. Each time this person ran with a different political affiliation and two times his was a minority party in the region and nationally.

10. The effects of the hydroelectric plant on the region and related aspects of the disaster are analyzed in Doughty (1987).

11. A notorious case in point for Perú was that of the provincial city of Tarma, hometown of a Perúvian president (M. A. Odria, 1948-56) who favored his birthplace with instant modernization -- paved roads and tourist hotel among other things.

12. The plane was supplied by the hydroelectric plant (Santa Corporation) which used it for its own purposes as well. In the bureaucratic battle however, the Santa Corporation, even though a semi-public agency, lost to its rival organization.

13. All of these volunteer groups are well-remembered for their good works. There was no overlap in any of their periods of work in Huaylas. The U.S. volunteers arrived shortly after the quake, working for a few weeks, led by a popular former Peace Corpsman who had previously lived in Huaylas for 2 years (1963-4). The Russians set up a field hospital in the kindergarten for several months, beginning in September, 1971 long after the emergency had passed. Although they were quite reclusive, their contributions are positively remembered as well. The Dutch volunteers stayed two years helping in a variety of ways. Two of them married young women from Huaylas who now live in Holland.

14. In order, these were: The National Assistance Board, The National System to Support Social Mobilization, Regional Organization for Support of Mobilization, National Office for Cooperative Development, Catholic Relief Service, Seventh Day Adventist World Service, Cooperative for American Relief Everywhere, Agency for International Development, National Urban Development Plan, Nuclear Educational Center, Integral Development Project and Organization of American States.

15. Thus the Seventh Day Adventist Welfare Service (SAWS in English, OFASA in Spanish) was "given" portions of the western slope of the Cordillera Negra and the city of Casma; Catholic Relief Services, portions of the Provinces of Santa, Trujillo and others; Church World Service, the Province of Aija and the Huarmay valley, all of which made extensive use of US PL 480 foods under "food for work" programs. The "good works" competition between nations and PVOs can be noted by the tone of reports recounting the "box score" on assistance trumpeting nationalistic and sectarian achievements (Perú Earthquake Voluntary Assistance Group, nd).

16. I attended several of these meetings in 1970 as the representative of the Perú Earthquake Relief Committee (PERC or in Perú, the CPDPD), an ad hoc organization of anthropologists, ex-Peace Corps Volunteers and others interested in the Callejón de Huaylas. PERC

had no such area assignment. Other agencies however, vied with each other for the "best" regions and some of the smaller sectarian religious and private organizations saw this as an opportunity to promote their own long-term interests in Perú.

17. In this fashion, three district capitals, Pueblo Libre, Matacoto and Shupluy, became divided with each of their already small populations now living in separate areas competing for assistance.

18. Yungay city on the other hand was directly assisted by one of its native sons, a general.

19. This was incompetently installed in 1978 however, and was being slowly replaced in 1983.

20. In an embarrassing display of provinciality, the Air Force general who then directed CRYRZA could not locate the major provincial capitals and locations of most importance during a special briefing for Mrs. Richard Nixon and her party of "experts" at the US Embassy residence in July of 1970. Indeed, no one among the high level authorities present could do so and thus the "details" of place were glossed over. Gross errors of fact accompany official documents of all types, such as that of AID (AID, 1970) which claimed that 70% of Ancash's population lived in the Callejón; that the cities of Huaraz and Yungay had populations of 65,000 and 20,000 respectively (actually about 30,000 and 4,000) and that the village of Ranrahirca lost 1,800 persons although it only had a total population of about 400, most of whom survived.

21. In July of 1971, I visited numerous districts in the region and upon returning to Lima, availed myself of contacts to reach President Velasco's office with the universal complaints about CRYRZA operations. Whether my intervention was influential I cannot say, but Velasco's staff was apparently concerned enough to move the headquarters to Huaraz to facilitate work.

22. In 1982 some 16,000 tourists, 87% of them Perúvians, visited the area, making it one of the most popular areas for national tourists (Perú, 1982:31).

23. Supe is an industrial and architecturally unattractive city on the coast near Lima.

24. The cities of Chimbote, Casma and Huarmey were severely damaged in the disaster. Chimbote's population increased 15% per year between 1961-72 (Dobyns and Doughty, 1976:302). Being the department's largest city and center for the steel and fishing industries, it received proportionately the largest amounts of disaster recovery assistance, further adding to its "boom town" character as the target for migrants.

25. This made it possible to travel with ease from one end of the Callejón to the other in less than an hour instead of 3-4 as before. This greatly enhanced the development of the Huaraz market on a daily basis rather than on Sundays when the large market convened in pre-disaster times.

26. See Doughty (1987:151-157) for a comparison of development costs and failed projects in the region as compared with community development approaches. In light of the Perúvian post disaster experience, one must also question the ability of such agencies as USAID to absorb and manage such enormous increases in available funds and apply them to effective projects.

27. U.S. Agency for International Development relief assistance provided thousands of sheets of steel roofing in the immediate post-quake period which was widely distributed to families and later incorporated into the permanent housing.

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The fifth period of time is our own;
it will come to an end when the world
disintegrates in a cataclysmic earthquake.
Eric Wolf, Sons of the Shaking Earth

México, pais eminentemente histórico,
pero predominantemente subordinado, ha
llegado a "construir" la ciudad-catastrofe
por excelencia de nuestro siglo.
Hector Manjárrez

IT SHOOK AGAIN --
THE MEXICO CITY EARTHQUAKE OF 1985(1)

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Introduction

The Mexico City twin earthquakes of September 19 and 20, 1985 confirmed much of the wisdom developed over the past two decades of research on disasters. The stress experienced by the families and neighbors of victims was predictably intense. The interaction of international rescue brigades and relief organizations with Mexican government agencies was sometimes strained, sometimes inefficient, always complex. And, in the absence of official preparedness, spontaneous, emergent groups, formed by neighbors

Adapted from:

Candela, M. A., Leon, A. I., and Venegas, N.
1986 "Que Podemos y debemos aprender de los tembiores recientes?" Cero en Conducta 1:3:26.

AREA OF MAJOR EARTHQUAKE DAMAGE

1985

1979

1957

TOTAL AREA OF DAMAGE, 1985

and the kin of victims, began immediate rescue and relief operations (Kreps 1978; Quarantelli 1978; Torry 1979b).

In this chapter, we focus on the potential political consequences of spontaneous rescue operations organized by ordinary people. In a Latin American nation like Mexico, where the political and administrative apparatus operates in a complex web of patronage, established political groups have a lot to lose if they cannot respond quickly and effectively to the needs of people who have been struck by a disaster. Spontaneous rescue and aid operations can threaten the very legitimacy of the state; indeed, many observers concluded that the Mexico City earthquakes were highly political events (Manjárrez 1986; Monsivais 1986; Mussachio 1986).

This political dimension of disaster response may, in fact, characterize the aftermath of every major disaster. It can produce a temporary realignment of social classes (that would ordinarily complete for power) and modify existing cultural rules governing interaction among members of different socioeconomic groups. This has consequences on two levels: the macro level of urban politics and the micro level of families adapting to grief, to material loss, and to threats to their very survival in devastated neighborhoods and workplaces.

There are many tantalizing allusions to disasters as political events but, from our perspective, the literature does not deal adequately with the importance of how political machines mobilize (or fail to mobilize) response to disasters. Abney et al., for example, concluded that the mayoralty campaign of 1965 in New Orleans was affected by the sitting administration's reaction to a hurricane (1966:9-74). Anderson (1969:242) concluded that the role of the military in natural disasters depends on its place in the political system. Quarantelli and Dynes (1977) identified some analysts' attention to the political dimensions of disasters.

Torry drew attention to "institutionalized procedures for transferring risk" (1979a:46-47). David and Seitz did a "comparative cross-national assessment of disaster effects" employing four generic analytic categories: government effectiveness, government instability, available resources,

and social context (1982:561). Diggins, Wright, and Rossi focused on local elites interacting with municipal government in Pennsylvania (1979). Wolensky and Miller discussed the political issues associated with disaster response in their "analysis of a politically charged recovery process" (1983:260). They concluded (correctly, we believe) that "disaster recovery is a political process" which "requires that agendas be set, decisions made and policies implemented" (1983:268). In a commentary on Latin American disasters, Oliver-Smith makes explicit reference to political variables: "A disaster is a historical event - and the aftermath of disaster is process coming to grips with history" (1979:96; see also Claxton 1986).

The political dimension of disaster response is usually ignored, however. The first published synopsis of the 1972 Managua earthquake avoided critically detailing the structure of the Somoza dictatorship which determined the character of the relief and reconstruction effort (Kates et al. 1973). A much later essay by Bommer rectified this omission (1983). There is a need to conceptually specify the role of political phenomena in analyses of disasters, particularly in the complex and economically dependent societies of Latin America and elsewhere in the Third World. Bates et al. noted the differential impact of Guatemalan earthquake damage among social classes and ethnic groups, and said in passing that domestic assets varied with political status "inside the administrative system" (1982:761).

Our discussion of the political phenomena associated with disasters begins by distinguishing among 1) the state(2) (a sovereign, institutionalized hierarchy of power justified by law); 2) the government, or cadre of functionaries in control of the state apparatus of public administration; 3) civil society (an aggregate and hierarchy of social classes with differential access to wealth and the productive apparatus); (3) and 4) private volunteer groups and individuals without explicit public authority. All these elements were evident during the aftermath of the twin earthquakes in Mexico City, affirming Krep's trenchant observation: "Disasters both reveal elemental processes of the social order and are explained by them" (1984:327).

Whereas state and civil society comprise the context for politically consequential social action, there are tradi-

tions and rules pertaining to any political process - and the Mexican one in particular - which make the observed official response to the twin terremoto disaster both predictable and a precedent. Before outlining this argument in more detail, we summarize what happened in terms of human and material losses (the bibliography is meant to be as exhaustive as possible).(4) Next, we describe the actions of the emergent coalition using a noted author's 50-item newspaper series as our "ethnography of the event." Following that, we present a summary of the adaptive strategies of 40 extended families, 20 of whom suffered direct damage to home and/or workplace and 20 of whom did not. In our concluding section, we describe the political coalition that expedited reconstruction of damaged housing and we offer some reflections on the consequences of the earthquakes for the structure of politics in Mexico City.

The Sequence of Events

On September 19, 1985 at 7:18 AM, the long-predicted "readjustment" of the Cocos and North American tectonic plates finally occurred. The epicenter of this event was about 50 kilometers out to sea from the south of the Balsas River, ca. 17.9 degrees N and 102.5 degrees W., some 400 kilometers from Mexico City (ECLAS 1985:3). One geologist estimated the energy released was equivalent to 1114, 20-kiloton, Hiroshima-type atomic devices (quoted in Monsivais 1986:1).

A second, complementary quake occurred about 36 hours later, at 19:38 on September 20 adding to the total of 54 seismic events greater than 7 on the Richter scale since Mexico's independence in 1821 (CET 1985:12). The first quake on the 19th registered 8.1 (long waves, MW) on the Richter scale, and the following day measured 7.6 with an epicenter slightly SW of the former. Both quakes shared a magnitude of between three and five times the predicted strength, for reasons yet unknown.

The first major quake had a single frequency with a cycle lasting two seconds, which unfortunately coincided with the resonance frequency of Mexico City's lacustrine soils. The quake lasted between two-and-a-half and three

minutes, and the harmonics between the tremors' frequency and the soil resonance brought down many buildings between 8 and 15 stories high. That first earthquake caused damage in the area of 800,000 square kilometers, particularly in México City and in states sharing a similar radius from the epicenter: Jalisco, Colima, Michoacán, Guerrero, and México (ECLAC 1985:6). The following tables show the scale of human loss and material destruction. Table 1 is derived from the excellent report prepared by the United Nations Economic Commission for Latin America and the Caribbean just six weeks after this devastating event (ECLAC 1985). Table 2 is taken from a succinct pamphlet, detailing the earthquake's effect on Mexican labor (CET 1985). Table 3 is derived from several sources and outlines the loss and damage in the Federal District, Mexico's capital city.

Greater Mexico City has a population of 18 million, and it is estimated that 64% reside within the 16 delegaciones, or boroughs that comprise the Federal District. This densely populated metropolitan area, occupying 1500 square kilometers, produces 44% of the Mexican GNP, contains 25% of the economically active population, is home to 20% of the country's total population as well as one-third of all public employees in the nation, and absorbs 25% of the Mexican federal budget and 33% of all government investment. A lacustrine basin 2240 meters above sea level, the city and has sustained a 150% increase in pollutants over the last ten years. During the same time, it has lost over 75% of its forest growth, currently being destroyed at the rate of 1000 hectares a year (Luiselli 1985:3-4). Many observers have remarked on this unique megalopolis and its collective "ecocide" (see Carabias and Herrera 1986, for example).

The losses sustained in the Mexico City quakes were as great as the city itself. Officially, over 7000 lives were lost, but some observers have reported that as many as 20,000 may have perished. Over 1000 buildings were destroyed, and another 5000 damaged. More than a third of a million were left homeless or had their homes severely damaged. This was the most damaging earthquake in Mexican history, and was one of the largest disasters anywhere in recent times. The Munich Reinsurance Company reported noted that "...the Mexico earthquake will take a prominent place in the history of the insurance industry ... the loss expenditure incurred by insurers will

TABLE 1

Estimate of Earthquake Caused Damage

	MILLIONS OF DOLLARS (A)		
	TOTAL	DIRECT	INDIRECT
Social Sectors	$1,524.0	$1,524.0	
Housing	563.4	563.4	
Health	553.1	553.1	
Education	407.5	407.5	
Service Infrastructure	$1,910.4	$1,736.7	$173.7
Public Buildings	1,219.7	1,219.7	
Communications	328.1	225.0	103.1
Tourism	186.1	161.3	25.3
Water and Sewage	23.8	21.9	1.9
Energy	20.3	9.4	10.9
Transport	18.1	17.5	0.6
Banking	64.4	63.8	0.6
Recreation	21.3	18.1	3.2
Personal Services	28.1	----	28.1
Other Sectors	$ 669.1	$ 327.8	$341.3
Steel, metals and fertilizers	22.5	9.4	13.1
Small and Medium-sized industries	425.9	318.4	107.5
Cultural Heritage	?	?	?
Emergency Expenses	74.4		74.4
Demolition and rubble removal	146.3		146.3
TOTAL	$4,103.5	$3,588.5	$515.0

Source:
United Nations Economic Commission for Latin America and the Caribbean, Document LC/G. 1367/Corr.1, 31 October 1985, Mexico

TABLE 2

Earthquake Loss and Damage Outside Mexico City

DAMAGE	JALISCO	MICHOACAN	COLIMA	GUERRERO	EDO.MEXICO
Lives Lost	614	35	1	2	1
Injured	491	270	16	20	N.A.
Displaced	4,293	574	N.A.	224	N.A.
Homes Destroyed	1,288	400	2	N.A.	N.A.
Homes Damaged	700	N.A.	N.A.	N.A.	N.A.
Churches Damaged	25	141	N.A.	N.A.	N.A.
Schools Damaged	1	1,158	N.A.	N.A.	N.A.

Source:
Centro de Estudios del Trabajo 1985:28.

TABLE 3

Summary of Loss and Damage in Mexico City

Total Human Lives Lost	
(Officially: 7000)	20,000*
Total Injured	40,000*
Total Left Homeless or With Damaged Homes	350,000*
Total Receiving Temporary Shelter	30,000
Total Temporary Shelters (Albergues)	150
Total Persons Unemployed	150,000
Total School Children Without Classrooms	650,000
Total Buildings Destroyed	
(listing by category not available)	1,091
Total Buildings Damaged	
Residences	5,025
Schools	3,072
Offices	800
Services (Public markets, Rec. Centers, Theatres)	254
Commercial	244
Industrial	81
Hospitals (500 beds, 30% total)	24
Total Vehicles Destroyed	
Private	1,200
Public Transport Units	300
Total Small Industries Affected	
Retail Damage	526
Total Loss	800
Total Insured Damages	$4 Billion U.S.*

*Estimates

Sources:

U.N. Economic Commission for Latin America and the Caribbean, 1985: Centro de Estudios del Trabajo 1985: Secretaria General de Obras/DDF. 1986:PROCESO magazine reports.

probably exceed all comparable payments for earthquake events in recent decades" (1986:47).

Spontaneous Response

Public officials, including the president, urged the city's citizens to remain at home. Instead, up to a half a million neighbors and volunteers mobilized within hours of the first devastation to dig out their kin and friends, establish shelters in public and private buildings, feed the homeless and the rescue volunteers, and later, to feed members of the international brigades which arrived after the initial official rejection of foreign assistance was withdrawn (Monsivais 1986:13). The spontaneous rescue brigades eclipsed the efforts of government agencies, political parties, and the Catholic Church. The volunteer brigades became a massive act of civil disobedience, spanning the city's disparate social classes. They meshed with established barrio/neighborhood/colonia organizations, and the entire effort created a communitas, a solidarity that, because of its scale and spontaneity, could not be coopted by government agencies or established political parties. And it occurred while police and military personnel largely looked on or pillaged the rubble and rescued others' possessions (Monsivais 1986, passim).(5)

Here was a new political phenomenon in contemporary Mexican history, with potential long-range effects on Mexico City's fractious urban political scenario. The emergent coalition's round-the-clock actions and presence throughout the heavily damaged areas of Mexico City became a threat to the state's monopoly on the instruments of social control. Upwards of 1500 lives were saved by the volunteer brigades, and virtually all observers agree that this "rubble society" discovered their own political potential as a result of this massive act of civil disobedience (Monsivais 1986:14).

When the Mexican Army and police began to cordon off damaged buildings, sometimes preventing people from continuing to extract their dead and injured kin, the sensation of indignant rebellion against corrupt construction practices, official neglect, and greedy landlords was reinforced (Aguilar Z. 1986:112). The state's lack of preparedness for such a disaster was noteworthy; there was

no public list of the dead, injured, and missing; nor were temporary shelters and camps organized and provided with basic services; six million city inhabitants went without water, some for several days, and the eventual, political call for "normalization" was interpreted as a return to prior authoritarian political forms and information management (Monsavais 1986:19).

On October 9, 1985, the Mexican presidency created by decree a National Reconstruction Commission (Comision Nacional de Reconstruccion Nacional) replacing the initial National and Metropolitan Emergency Commissions (Comisiónes Nacionales y Metropolitanas de Emergencia) to oversee the rebuilding effort. On October 2, the president issued an expropriator decree which was amended on October 11. These decrees declared 5480 urban lots covering 217 hectares in 78 colonias to be federal property (Musacchio 1986:102). Renovación Habitacional Popular was created to construct 42,000 single family dwellings at several locations on the expropriated downtown lots. These measures constituted the major legal and administrative initiatives provoked by the temblor.

The Poniatowska Reports

No anthropologist or social scientist produced an ethnographic report on this large-scale event. Those who were directly affected and survived joined volunteer rescue brigades; others were mobilized by universities and by their own kin; still others stayed home. Rather, the best accounts of what happened were produced by writers such as Cristina Pacheco (1986), Carlos Monsivais, and Elena Poniatowska. Poniatowska published a series of 50 reports in La Jornada, a progressive Mexico City daily (circulation about 50,000) between October 8 and November 30, 1985. These essays constitute the best ethnographic data available. UNO NAS UNO, another daily, also published a special supplement, 19 DE SEPTIEMBRE, chock full of data and commentary.

What follows is a summary of the Poniatowska reports, quoting from her and the informants she interviewed. Our intention is to describe the activities and opinions of members of the emergent coalition which mobilized rescue

operations throughout the damaged area in the city's center between Thursday, September 19 and Sunday, September 22. Poniatowska's journal was widely read and talked about in the city, and became the log book for the amorphous coalition of rescue cum political groups that later assumed a more orthodox form.

"¿Que más se va a acordonar?" (What else will be cordoned off?) was the initial, angry headline (October 8). Poniatowska reported that the Mexican Army began to take up positions around large, damaged public buildings at 3 AM on the morning of the 20th; civilians in the rescue brigades were ordered back, at gun point. Not a single borough chief, or delegado, offered a map to the press indicating the whereabouts of damaged buildings; nor were authorities forthcoming and helpful. On the contrary, some volunteer brigades were hampered by uniformed personnel. "¿Por qué los miembros del ejército llegaron con metralletas en vez de presentarse con picos y palas?" (Why did army troops appear with machine guns instead of picks and shovels?). And echoing opinions manifested in post-disaster gossip: "Acordonar no es salvar. Acordonar es impedir. Acordonor es oprimir. Acordonar es atemorizar. Acordonar es separar." (To cordon off is not to save, but to impede, to oppress, to instill fear, to separate).

A member of the devastated Juárez Hospital employees' union said: "This was done to prevent any organized groups from pressuring the authorities" (October 10). While firemen received accolades for their selfless duty, members of the federal and municipal police as well as the army were denounced for forcefully expropriating valuables that families had rescued from their damaged apartment buildings (October 13); there were cases of squad cars harassing volunteers who were attempting to deliver food to refugees and brigades (October 27).

Accountability for destroyed public housing was a major issue. Of the 102 buildings in the Nonoalco-Tiatelolco housing project, 10 had to be demolished, according to Monsivais (1986:22). On October 11, Poniatowska quoted a resident of the fallen Nuevo Leon building in that ill-fated project: "Lo que más me impresiona es la mezquindad: ni el Banobras, ni la Sedue, ni Fonhapo, ninguno acepta su responsabilidad." (What most impresses me is the lack of

accountability; neither the Bank of Public Works, nor the Ministry of Housing nor the Popular Housing Fund accepts its responsibility.) One bewildered citizen told her: "No es justo que en este país se caigan los hospitales, las escuelas, los edificios del gobierno, los de oficinas públicas; no es justo que le toque siempre a la gente más fregada." (It's not fair that our hospitals, schools, government and public buildings should fall; it's not fair that the poor always bear the worst) (October 12).

On October 13, Poniatowska broke a basic rule in the Mexican political system: the president shall not be publicly criticized. She wrote: "He addressed the nation only 39 hours after the first earthquake, not long after the second and tried to minimize the degree of disaster, rejected foreign assistance and projected the illusion of normality." President de la Madrid eventually negotiated, via emissaries, a stopgap solution for irate public-housing refugees whose shoddily constructed buildings had been destroyed; and he overruled his minister of health's decision not to reopen the destroyed General Hospital (October 24).

While urban anomie, the "unknown neighbors syndrome" is common to the public housing projects (October 11), getting former strangers, mostly refugees from damaged buildings, to discuss their traumas was a task organized by brigades of medical and psychotherapeutic professionals (October 14). A doctor said: "Es indispensable que se les estimule a hablar. Hay que provocar la catarsis." (It's essential they be stimulated to speak out. A catharsis is necessary.) In front of some destroyed buildings, kin awaited cadavers for as long as 21 days.

Another journalist, Teresa Gurza, reported on the Versalles volunteer brigade (October 16) and their witnessing two often-mentioned events: 1) the owners of some of the destroyed textile sweat-shops refused entry to the families searching for their wives' and daughters' bodies, arguing that the machinery must be removed first; and 2) a series of basements were discovered underneath the attorney general's offices containing secret cells and interrogation-torture victims (October 16). Considerable attention was devoted to the seamstresses, the tardiness of the body recoveries, and the successful organization of an independent garment workers' union (November 12, 26).

Under the headline, "La incógnita es ahora cómo va a expresarse el malestar social" (Now the unknown is how will the social unrest be manifest), Poniatowska paid tribute to the efficacy of the volunteer brigades, and some foreign rescue teams as well, underscoring how certain individuals became leaders during the course of their efforts (October 18). She noted how certain public buildings were rushed to demolition so that no evidence of their shoddy construction would remain (see Table 3). Faulty hospital construction was a major issue (October 29). Refugees from most government housing projects were dispersed so as to reduce the possibility of their forming emergent organizations (October 19).

While government officials offered to replace damaged housing, one resident detailed for Poniatowska several attempts to transport refugees to nonexistent buildings. Complaints were labeled "intereses particulares politizados" (private, politicized interests), but "nuestro problema es de derechos humanos" (our problem is one of human rights) (October 20).

While giving vent to those voices that stated what everybody knew ("a los que más mal les fue ahora - fue a los más pobres" (those who suffered the worst were the poorest), Poniatowska's reports (October 22) also described the folk heroes of the volunteer brigades; thin, young men who would burrow into the core of wrecked buildings listening for human survivors or locating decomposing bodies (October 19 and 23). Even elegant women from the rich colonies at the western edges of the city gathered food, medicine, and clothing for refugee shelters located in previously unvisited city neighborhoods, while students from the elegant, private universities were also to be found among volunteer brigades (October 24).

Some multinational corporations sent their medical personnel cum ambulances to work alongside volunteer brigades (November 16, 17). Doctors and medical personnel who survived the destruction of the General Hospital (47 doctors perished) were indignant when the minister of health services declared the hospital would not be rebuilt; they began attending the public in a tent city in front of the destroyed facilities, arguing that this form of public

medicine is essentially a political act of treating "the pathology of the poor" (October 25).

In those colonias, or neighborhoods, where established tenants' organizations and cooperatives were effective, refugees from the earthquake's damage were easily mobilized. Many lost their homes, workshops, and tools, but the legitimacy of the colonias' organizations went unquestioned. Tepito is a singular case where an effective power broker (and member of the artistic elite) helped negotiate a presidential decree that expropriated damaged buildings whose landlords were awaiting "urban renewal" for their valuable, downtown real estate. "Es obvio que la gente se desespera pronto y el gobierno tiene que recuperar el tiempo perdido." (It's obvious that people are becoming desperate, and the government must make up for lost time.) (October 28)

Well-organized tenants in the downtown colonias of Guerrero and Morelos were aware of a Federal District government plan to raze their decrepit dwellings to erect a "Golden Zone" replete with casinos. Eighty-six percent of the disaster victims were renters. A Jesuit advisor to tenant organizations noted: "Muchos caseros querian aprovecharse de los efectos del temblor para expulsar a los inquilinos" (Many landlords wanted to take advantage of the earthquake and expel their tenants) (October 28). The market value of these downtown lots without inhabitants would be considerable (November 3). A struggle ensued between tenants in poor colonias and their landlords interested in real estate speculation. The struggle was the backdrop for the neighborhood reconstruction political scenario and attempts to democratize Mexico City government.

Several incidents were reported where officials, some elected federal deputies, but mostly appointed funcionarios, were shouted down and asked to leave refugees' meetings and camps (October 11, 20, 28). Tension between refugees and officials was especially high in the Nonoalco-Tlatelolco public housing project where the fallen Nuevo León building had been declared structurally flawed four years before. A retired army officer, member of the project's self-governing administration, declared: "nuestra desgracia no es consecuencia del sismo, sino de la ineptitud y la corrupción de

nuestro gobierno y de sus instituciones" (our tragedy is not a result of the earthquake, but rather, the ineptitude and corruption of our government and institutions) (October 31, November 1).

Foreign press coverage tended to be rather alarmist (October 30), but the feedback nevertheless reinforced public opinion at home. Wall Street Journal reporters, for example, wrote of a "Nation in Jeopardy" (October 15, 1985), underscoring how the Mexican political system began to tumble, quoting a downtown wall's painted phrase: "La ayuda está siendo robada por el PRI y nosotros estamos en la calle" (Foreign donations are being taken by the government party, PRI, and we are destitute). Poniatowksa reports a consensus in the United States press: the Mexican government was very slow to react to the disaster. Considerable criticism was also directed at television news crews, domestic and foreign, awaiting a spectacular "save" or capitalizing, for example, on the pathos of the seamstresses anxiously awaiting their colleagues' bodies outside the downtown textile shops. "¡Aquí vienen algunos a hacer campañas, a obtener triunfos políticos y publicitarios a nuestra costa! (Some come here to campaign, to obtain political and public relations triumphs at our expense) (November 2).

The main studio of Mexico's private media quasi-monopoly Televisa, was severely damaged and the lives of 77 employees were lost; its signal transmission resumed about four hours after the first quake (November 7). Radio and television, both public and private, informed of the missing and dead for several days after the event. Nevertheless, the media generally remained within the implicit boundaries of official news management, though the opposition press provided an occasional exception.

Tales abound of individuals' struggles with authorities to discover their relatives' whereabouts, identify and bury their dead, rescue their valuables from the rubble, seek alternative shelter, and carry out volunteer brigade activities. (October 13, November 4, 5, 6, 9, 22, 23, 24). A government employee, who managed to escape from entrapment in his office, asked rhetorically: ¿En qué consistirá el fenómeno que hace que la calidad humana de las autoridades se haya manifestado en forma menos espontánea que la de

los voluntarios? (To what can we attribute the difference in spontaneous, human response between authorities and volunteers?) (November 23). Even medical doctors had difficulties: "Fue una guerra tremenda contra los burocratas (y) el Ministerio Público." (It was a continuous battle with bureaucrats and representatives of the Justice Department) (November 9).

On November 19, Poniatowska listed the major organizations, 45 of them, old and new, in 42 colonias, that formed the Coordinadora Unica de Damnificados (CUD) as a response to the government's creation of a National Reconstruction Committee. Organized September 24, the CUD led a march of the emergent coalition - 30,000 people - from downtown to the presidential residence, Los Pinos, three days later. Two months after the earthquakes, half a million people's lives remained affected (November 21). One militant's statements are significant: "En México, a cualquiera que reclama su legítimo derecho lo tachan de agitador, o de traidor a al patria, o de estar al servicio de una potencia extranjera ... Lo peor de nuestro pais es su clase politica ... Decimos no a la normalidad; no al la resignación y si a la organización y a la esperanza" (In Mexico, anyone who claims their legitimate rights is called an agitator, or a traitor to the nation, or at the service of some foreign power ... The worst thing we have here is our class of politicians ... We say no to "normalization," no to resignation and yes to organization and to hope) (November 21).

Concluding this macroethnography of the twin earthquakes, Poniatowska makes some concise observations:

> The State was bested in every case. Nobody turned to the Revolutionary Party ... to get organized, or even to its delegates. People organized with their families, their friends, their schools and churches. The church turned out to be really effective, and at the moment of truth knew how to help. ... From the perspective of the State, the earthquake could have been an opportunity to recover the legitimacy lost in the elections, the consensus lost to the economic crisis [in Mexico]. ... But the government did not organize the rescue of victims. It didn't respect

> human life, and it isn't bringing about reconstruction. ... If there had been a plan, the people would have cooperated spontaneously, but the decisions were so distant, so insensitive, that people preferred instead to organize themselves (November 29).

No better summary of the quake's legacy can be found. Here is the struggle between self-organized, emergent groups and government authorities, at the federal, municipal (Distrito Federal), and delegational (borough) levels. The outcome of this struggle, still in motion 18 months later, has affected politics in Mexico City, and thus Mexico as a whole.

Domestic Groups and Earthquake Damage

In order to investigate how domestic groups mobilized their members, resources, and linkages to the political process, we conducted a survey of a nonrandom sample of 20 families or domestic groups whose homes or workplaces were damaged or destroyed by the quake. The survey was conducted ten months after the quake, and all the families in the sample were from downtown Mexico City neighborhoods. We also studied 20 families whose homes and workplaces were unaffected. Some characteristics of the families whose homes were destroyed are presented in Table 4.

Widespread distrust of outsiders (researchers as well as government officials) did not permit us to select a random sample, nor could we delve deeply into participation in neighborhood political groups. Our data provide clues, however, to how family groups mobilized after the disaster.

Most families sampled resided in the heavily damaged Centro, Morelos and Tlaltelolco colonias, and there were variations among their organized efforts to negotiate solutions to housing needs. Those families whose homes and jobs were destroyed or heavily damaged - who suffered the most in material terms - were also those who earned less than the minimum wage (ca. $4 U.S./day at the time of the earthquakes). This group was only occasionally employed as domestics (such as the large group that lived in the 2272

TABLE 4

Profile of 20 Affected Domestic Groups

CASE	AGE	SEX	FAMILY TYPE	SCHOOLING	RESIDENCE (Colonia)	MARITAL STATUS	OCCUPATION OF INTERVIEWEE
1	21	F	Nuclear	University	Morelos	Single	Student
2	29	F	Nuclear	---	Morelos	Married	Housewife
3	35	M	Extended	University	Morelos	Married	Varied
4	--	M	Extended	---	Morelos	Married	Varied
5	--	M	Extended	---	Morelos	Married	Varied
6	--	F	Nuclear	---	Tlaltelolco	Free Union	Varied
7	25	M	Extended	University	Tlaltelolco	Single	Self-employed
8	24	F	Nuclear	University	Pensil	Single	Public Employee
9	--	F	Nuclear	---	Morelos	Married	Housewife
10	--	F	Nuclear	---	Taxquena	Married	Public Employee
11	26	F	Extended	Normal Sch.	Sin Dato	Single	Public Employee
12	--	F	Extended	---	Pearlvillo	Married	Varied
13	--	F	Nuclear	Primary	Sta. Maria	Married	Varied
14	39	M	Extended	University	Morelos	Married	Varied
15	24	F	Nuclear	University	Pantitlan	Single	Public Employee
16	35	M	Nuclear	University	Centro	Divorced	Public Employee
17	21	F	Extended	High Sch.	Roma	Free Union	Housewife
18	22	F	Nuclear	University	Del Valle	Single	Public Employee
19	20	F	Extended	---	Tlaltelolco	Married	Housewife
20	--	F	Nuclear	Normal Sch.	Morelos	Married	Public Employee

servant's quarters on the roofs of the public housing project known as Tlatelolco), or as itinerant vendors, part-time shoe repairmen, painters, masons, and construction workers. Many vecindad (slum) inhabitants without secure employment paid only $5,000 pesos (ca. $10 U.S. at the time) per month for rent and water.

Our 20 case studies show great diversity among the victims, as well as common themes. Case No. 1, María, is an only child, a student of mass communications in the National University (UNAM) who lived with her mother, a retired employee of the Social Security Institute (IMSS). Both subsisted on the mother's pension and contributions from the estranged father. They resided in a "vecindad," a multiple family slum household comprising 22 apartments and four bathrooms. Each apartment had interior sleeping lofts and, despite the erosion in the value of the peso, the government refused to allow landlords to raise their rents. In September, 1984, María and her mother paid just $20 pesos a month. At that time, a year before the quake, a presidential decree "melted" the "frozen" rents, which promptly rose to $2500 pesos a month (about $8.00 U.S. at that time).

As members of the Unión Popular Centro-Morelos, the vecindad inhabitants requested expropriation of their damaged dwelling because, by their calculations, it would be more costly to rebuild at their own expense than to raze the structure and rebuild under the expropriatory terms of the RHP program. Maria now lives with a former neighbor, the neighbor's husband, and the couple's two children. María reported that "entre organizaciones hay mucho canibalismo" (the urban organizations cannibalize each other's supporters). RHP would offer money to vecindad units to provoke their withdrawal from independent organizations also requesting new housing.

Case No. 10 in Table 4, Consuelo, was taking her children to school at the time of the September 19th quake. Her husband had already left their twins at his in-laws' home for the day and the eldest son was deposited at his junior high school (secundaria) before the husband began his workday at 7 am.

After the quake, Consuelo scurried to her parents' nearby home, which went undamaged. That same day, the family moved to a new house which had recently been purchased in a distant lower middle class colonia between Ixtapalapa and Tulyehualco, where Consuelo's brother was living. Consuelo's parents were reluctant to leave the centrally located apartment that rented for only about $50 a month. The apartment where Consuelo lived with her nuclear family was not destroyed, either, but fear - and the parents' invitation that Consuelo and her family move away from the damaged part of the city - were persuasive. Consuelo worked at the totally destroyed Medical Center and, temporarily, was without any work assignment. The children's schools were also damaged and were declared unsafe. Though they were able to salvage all their possessions, the adjustment to the new location and, particularly, the children's adjustment to new schools, was traumatic. Consuelo said that they suffered a "decline in status" and that the children's schoolwork deteriorated as well.

Case No. 12, Socorro, is married to a free-lance plumber who is often underemployed. They have three children, and rented rooms in Colonia Peralvillo for $4000 pesos a month. Their building was unsafe to inhabit after the quake, so Socorro and her family moved in with her brother and his family for a few days. Because they were so many kin in cramped quarters, Socorro and her husband decided to move into a street camp. After consulting with a neighborhood organization, they were told that they would be eligible for relief housing, but they would have to move to the Santiago encampment first. They remained in the camp for two months.

During the hectic few days at her brother's, all of Socorro's family's possessions - clothes, furniture, kitchen utensils - were stolen from the damaged building where they had been living. With donated clothes, blankets, and cooking gear, they were able to get by in the provisional street shelter. Before the earthquakes, Socorro had sporadically worked as a charwoman. Once she began living in the street, however, she was afraid to leave her infant daughter in the camp and was unable to work. Many of the camps were located on boulevard dividers; children could (and did) stray into traffic and some were injured or killed by passing vehicles.

Life in the camp was difficult; a shortage of water obliged Socorro and others to wash and bathe between 2 and 4 am. And there were conflicts over the use of the eight-burner communal kitchen gas stoves serving 20 families. Who would clean the camp bathroom and kitchen? Why should we share equally the cost of the liquid propane cooking fuel when some families cook more than others? Socorro and her husband were considering returning to her native city of San Luis Potosi, or to his village near Irapuato, Guanajuato.

Case number 7 is Alejandro, a self-employed shoemaker. The water tank of the public baths adjacent to Alejandro's vecindad (slum) collapsed after the first quake. His apartment, and three others in the vecindad were destroyed. Several people in the vecindad were injured, but Alejandro and his family escaped physically unharmed. They moved into a provisional street camp, which were renamed "módulos," or modular housing, by government architects after a few months.

Rules were established prohibiting families from using their living space as workshops, but the rules were ignored. Alejandro receives precut pieces of leather and plastic materials. He and four other members of his extended family sew and glue the pieces together in accordance with specifications provided by the factory that farms out this piece work throughout the poor downtown neighborhoods. Each finished pair of shoes brought $185 pesos (about 26 cents in U.S. currency at that time), and the four workers earned between 20 and 25 thousand pesos (between $29 and $35 dollars) a week in their makeshift workshop that took up half their allotted living space. "El dia que no hay trabajo no lo hay y ya!" sid Alejandro. ("The day there's not work it's all over!"). With no social security or any kind of benefits from the factory, the family is part of the <u>maquila</u>, or "piece work" culture.

At the time of the survey, in July, 1986, Alejandro thought the worst was over. "Until recently," he said, we felt desperate - there was a lot of sickness, and the children were affected by the dust and the lack of water [in the camp]. Now, we're used to this. It's ugly here, but we don't pay a thing. If they let us stay here, fine. I'd like that because we don't pay anything....There are some people

who simply can't pay...Now there won't be living quarters with rents, like before." Alejandro is worried about not being able to make the payments on the government housing units that are being built and distributed.

From cases like these, one finding in our limited sample was that vecindad families did not always use their kin network to seek temporary shelter. Rather, like Alejandro and others, many of them moved into the temporary camps in the streets. Later, when the RHP, or Renovación Habitacional Popular substitute housing program got underway, they occupied the "modules" assigned by Federal District housing authorities. Residence in the camps was a prerequisite for qualifying for the government disaster housing program. Thus, these temporary shelters were the only endowment these families possessed. A similar situation was observed for the recipients of provisional housing after the Yungay avalanche disaster of 1970 in Peru (Oliver-Smith 1986:144).

People residing in vecindades who lost their homes and hence, their domestic workshops, were justly insecure about their capacity to provide basic family needs. They slept, ate, studied, worked, and socialized in the dwelling unit. One informant noted, wryly: ¡Nosotros somos una familia accomodada, vivimos unos arriba de otros! (We are a family that is well-adjusted to one another. We live one on top of the other!). These families had few material possessions and no permanent shelter. Income security - steady employment or at least steady underemployment - determined whether families entered a temporary street shelter or sought shelter with already overcrowded kin.

Working members of these families (whose kin resided in the same barrio or colonia and were often neighbors) depended on daily fluctuations of market demands for their skills and wares, and each person contributed a portion of their income to the household. For these families, when there is nothing to sell or no one is hiring, they have no income.

This decision to enter a temporary street shelter, while not a product of many options, entailed a radical readjustment in domestic group behavior; not only did everyone sleep in makeshift street shelters or foreign relief-supplied

tents, but they went without a private bath and kitchen (rather sacrosanct spaces in any urban Mexican household), while having to guard those few possessions rescued from the rubble. Petty thievery was a fact of life before, and a particular problem after the earthquakes. This new living situation was traumatic.(5)

A second group from the downtown colonias, many of whom also lived in destroyed vecindades, suffered a temporary loss of their jobs, but did mobilize their kin network to seek shelter in someone else's home. These were people who had low-level government jobs, in the main, and thus shared a measure of job security. Their offices were destroyed but their jobs were not, and they continued to receive their salaries while awaiting relocation of their workplaces. This meant that they were eligible for relief housing as government employees, and, therefore, it was practical for them to request shelter from kinfolk until their employee's union, for example, could negotiate their future housing. Few were willing to suffer the indignities and discomforts of the street camps as a tactic to assure future housing. This was a forced choice only for those who lost both housing and job.

The 20 families that we studied that did not suffer loss of home or job nevertheless were obliged to do without basic services - water, power, telephone, reliable transportation - in the world's largest city. Their social characteristics were quite similar to those of the 20 families who lost their homes or workplaces. Many expressed a sense of guilt for not having participated in the rescue brigades. Others offered opinions, largely critical, of official rescue and reconstruction efforts, while simultaneously recognizing the difficulty of being prepared for a disaster of this scale. One informant said: "El gobierno mostró un gran desprecio al pueblo, mostró autoritarismo, tuvo miedo de que se llegaran a consolidar las formas de organización autogestionarias; hubo mucho oportunismo de ciertas personalidades." (The government showed a disdain for the people; it was authoritarian, afraid to allow the self-help organizations to consolidate their efforts. Many public figures acted opportunistically.) The frequency of negative observations among this control group underscores of course the potential for a government's loss of legitimacy after a disaster of this magnitude.

Self-Help and Politics

The role of Renovación Habitacional Popular (RHP)- the government's relief housing construction agency created shortly after the expropriatory decrees of October 14, 1985 - shows how the state acted to consolidate and/or regain its authority, and how disaster victims negotiated their relief effort with an established but weakened authority.(6) Previously existing urban barrio improvement organizations formed an organized core of civic groups, the Coordinadora Unificada de Damnificados, whose calls for urban renewal and relief housing were reactivated by the earthquake victims. Ramirez's article, "Organizaciones Populares y Lucha Politica" provides an excellent summary of this highly charged political scenario (1986a).

Pena Morelos was an organization with a lengthy legacy in the colonia of the same name; similarly, Amanacer del Barrio was active in the colonia Centro. The Unión de Vecinos de la Colonia Guerrero had been active since the municipal government drove wide boulevards through their neighborhood in the late 1970s. Similarly, the Unión de Inquilinos y Vecinos del Centro, the Movimiento Unido de Damnificados e Inquilinos, and the Consejo de Renovación Popular were active, independent groups. On the 103 rooftops of the Tlatelolco public housing project, the Coordinador de los Cuartos de Azotea de Tlatelolco was influential, as were each damaged building's postdisaster organization. Any future detailed history of the earthquakes' aftermath must focus on these groups and their interaction with government agencies.

In sum, previously existing neighborhood groups joined forces with emergent disaster victims to create a collective quilt of organizational patches from numerous colonias. These were the groups with which government relief housing authorities had to negotiate. Renovación Habitacional Popular was required to integrate its operational construction program with these emergent organizations, or to appropriate their constituency, if the municipal authorities were to reclaim lost legitimacy. No doubt, someday, a participant in this lengthy, complex and often sordid affair will publish an account detailing what actually happened in each damaged colonia. This will be the unofficial story.

It became evident that RHP was to act alone, monopolizing the housing reconstruction strategy on the expropriated urban lots. RHP promised a payment of $100,000 pesos to each affected domestic group if they signed up for RHP housing in addition to the "campamento" prerequisite. Given the level of destitution of many families, this offer could not be refused. Hence, the political independence of the emergent coalition of existing neighborhood pressure groups and indignant, mobilized disaster victims was undercut by the RHP's "take it or leave it" relief housing strategy. By consolidating state hegemony in this fashion, a generalized antigovernment urban movement was defused.

By May 7, 1986, almost eight months after the disaster, the government negotiated a Concertación Democrática para la Reconstrucción, wherein the official agencies responsible for the reconstruction effort (RHP, along with others) signed an agreement with elements of the "sociedad civil," that is, with disaster victims' organizations, universities and research institutes, technical support groups (architects, e.g.), guilds, chambers of commerce and industry, and private foundations (associaciones civiles). The Concertación document was published in major newspapers on May 19, 1986, and is a good example of how hegemony and responsibility are negotiated in the Mexican political system. The very limited participation of private enterprise in the aid and reconstruction efforts should be emphasized. Nevertheless, the private foundations that were signatories to the Concertación accord represent the major power figures from all levels of Mexican politics.

RHP delineated sets of neighborhoods within its own administrative zones, and these zones largely coincided with extant organizations. Each RHP zone official was made responsible for negotiating with a particular group of citizens. Other relief organizations working in the heavily damaged colonias were affiliated with international agencies, largely religious groups, and private foundations. This assistance was devoted to building or rebuilding housing best suited to the earthquakes' victims. Construction professionals - architects and engineers - offered their own designs or created new ones in consultation with victims. These private reconstruction projects were pushed aside, however, when RHP began to establish its administrative apparatus in

the damaged colonias and reconstruction zones containing expropriated lots.

RHP devoted its resources to building 42,000 low-cost, single-family dwelling units (see Table 5). In this fashion, RHP appropriated the foreign donations earmarked for relief housing. Similarly, RHP imposed its own architectural and hence, social design on the reconstruction process; alternative designs were disdained with a few exceptions (the Metropolitan University's Azcapotzalco campus architecture school was able to construct housing units in three locations).

The housing reconstruction process and its parallel political demobilization was thus centralized. The independent, non-Partido Revolucionario Institucional (PRI) and hence, oppositional political forces were unable to overcome this tactical defeat. Had RHP not coopted or rechanneled the relief housing movement in this way, the municipal government of Mexico City would have lost its considerable power and legitimacy in the several colonias involved.

Phase two of the RHP housing relief program is scheduled to begin in April, 1987 on private, unexpropriated lots whose owners are supposed to reimburse the RHP for construction costs. Some 40,000 units are scheduled to be built. The traditional patron-client pattern of Mexican public administration and public works projects has so far prevailed and supplanted alternative proposals and agendas put forward by the emergent groups that grew out of the rescue efforts. RHP did not construct the new housing with its own personnel and equipment; rather, over 500 contractors have been involved and the traditional pattern of <u>contratismo</u> has prevailed.

Profits from construction materials' suppliers and subcontractors were substantial; the unit cost per square meter of construction at the time was about 1000 pesos and was sold to "relieved" homeowners at 4036 pesos. The new homeowners are paying interest of 14% per month on their unpaid balance (data from RHP). Furthermore, the repayment schedule for the dwelling units was pegged to the minimum wage at the time of delivery, not at the time, 18 months before, when the victims were obliged to sign up for RHP housing at the then prevailing minimum wage rate;

TABLE 5

Summary of Renovacion Habitacional Popular Program
(April 1987)*

Urban Lots Built Upon and Delivered	3,126
Urban Lots Under Construction	2,945
Housing Units Completed (April '87)	46,500
Housing Units Delivered	44,500
Housing Unit Space	40 Square Meters
Cost Per Square Meter	$1,000 Pesos - Net
Sales Price Per Square Meter	$4,036.00 Pesos
Housing Units Construction Costs	
Rehabilitation	$1,600,000 Pesos
New Construction	$3,250,000 Pesos
Form of Payment for Housing Units	30% of the Current Minimum Wage Per Month
	17% of "Socal Interest" per Annum on the Unpaid Balance
	14% Interest per Month on the Unpaid Balance
Cost of Housing Repair	$1,500,000 Minimum $2,225,000 Maximum
Title Certification	Free
Public Agencies cooperating with RHP in Housing Construction and Delivery	SEDUE DDF FONHAPO, INFONAVIT, FOVI, FOVISSTE
Facilities Affected by Earthquake	350,000 (note difference with units delivered)

SOURCE:
Renovacion Habitacional Popular, 1987

* The Mexican peso was trading at around 1200 per U.S. dollar at the end of April 1987.

inflation and the corresponding devaluation of the peso has been considerable in the interim. Most of the RHP homeowners are underemployed to begin with, often earning less than the minimum wage.

Conclusion

We have presented a summary of official responses to the tragedy, of popular participation, and of criticism of government efforts. We have supplemented this with comments gleaned from a survey of two groups of families, those whose homes and jobs were destroyed by the quake, and those who lives were not so drastically affected. All the evidence points to the overwhelmingly political nature of the earthquake aftermath. This is not surprising if we recall that postdisaster responses in Latin America always occur in a context of extended kin groups that participate differentially in power hierarchies and in patron-client relationships. These power groups and relationship may, in fact, constitute the operational mechanisms of public administration and political action (see references cited in Grindle 1977). In rural areas these mechanisms are kin based and often quite vertical; in urban contexts, the networks are complex and involve overlapping class, kinship, colonia, occupational and partisan interests (see Cornelius 1977; Rothstein 1985).

In the Mexico City case, neighborhood organizations consisting of kin groups (varying in their extensiveness) redefined adaptive strategies after the earthquakes. These groups used traditional skills in mobilizing and negotiating with public agencies responsible for colonia affairs and housing (private university and church programs were minimal although significant).

In some colonias, neighborhood organizations shared a lengthy history of battling against slum lords and the indifference of Federal District borough (delegación) authorities (see Ramirez Saiz 1986a, b). Each damaged colonia (e.g., Morelos, Tepito, Guerrero, and the Tlaltelolco public housing project) provide complementary examples of this process. Noteworthy was the lame leadership exercised by opposition political parties in the damaged portions of Mexico City. Traditionally, the opposition parties have been

influential in many of the damaged neighborhoods, which have been historically neglected by city government and manipulated by the Institutional Revolutionary party political machine.

These traditional channels of political action were not wholly ignored, but legitimacy was attenuated, and there were instances of official, and PRI obstruction of new, emergent group-led alliances of disaster victims who made vociferous and well-reported demands of deficient public services. These demands accelerated the consolidation of new alliances or redefined old ones.

These emerging alliances, however, employed traditional rules of patron-clientism to recruit adherents and to achieve objectives, both immediate and long term. None of this occurred in a vacuum, of course, but in the larger historical process of increasing economic and technological dependency, net capital export (given current national debt repayment obligations), and a growing polarization between educated elites - both political and entrepreneurial - and those who must work for a living, in the fields, offices, industries, and service jobs (see Hamilton 1985b).

The major political events in Mexico since the twin earthquakes may have shaken the traditional political hierarchy. There was a clamor for and subsequent presidential initiative to grant representative government to the disenfranchised inhabitants of the Federal District (see Stockton 1987); the student mobilization of early 1987 led by the Consejo Estudiantil Universitario (CEU) was seen by many observers as a part of the quake's aftermath; the labor movement is restless and a profound factionalism in the ruling party has developed, wherein the minority Democratic Current (Corriente Democrático) impugns traditional authoritarian party procedures. Mexico continues to shake, 18 months after the <u>temblor.</u>

NOTES

1. Our special thanks to the staff of the Natural Hazards Research and Applications Informational Center at the Institute of Behavioral Studies, University of Colorado, Boulder. They made available materials about the Mexico City earthquakes, virtually unavailable in Mexico.

2. Whereas the issue of what is and what is not "the state" has not been well addressed in social science, Nora Hamilton, writing in reference to Mexico, makes a cogent characterization: "The power of the dominant class - constitutes a major constraint limiting the state to options within a given system of production. Within this constraint the form and the functions of the state will vary - according to the degree and type of influence of the dominant class, pressures brought to bear by subordinate classes and groups, and developments within the system of production" (1985a:69). It could well be that given a lack of conceptual attention to the state, it is unsurprising that the political dimensions of disasters go unattended in U.S. anthropology.

3. The phrase "sociedad civil" figures prominently in Mexican political rhetoric and journalism. Monsivais' trenchant definition is appropriate: "The sociedad civil means, for various sectors of the population, a community-level force for self-management and self-help in rebuilding, and is outside the control of either the government or the business oligarchy" (1986:18). Gramsci might not approve.

4. Some bibliographic items were detected but remained unobtainable during the preparation of this article: reports from each National University research institute and faculty, for example, whose members participated in the volunteer brigades; the analysis of structural damage to the National University, done by the Institute de Ingeneria; internal documents of the Renovación Popular Habitacional relief housing construction agency of the Mexican government; a report from the Metropolitan University (UAM-Azcapotzalco campus) architecture school whose staff and students

designed and helped build new housing in downtown Mexico City; reports of the International and Mexican Red Cross; reports of the Salvation Army and other private and/or religious relief agencies; a special issue of Christus magazine published by the Mexican Society of Jesus; final reports of the National Reconstruction Commission and of the Metropolitan Reconstruction Commission (viz. preliminary Informe del Comit de Reconstrucción del Area Metropolitana de la Ciudad de México, Uno Más Uno, March 6, 1986). Undoubtedly, there are others. The plethora of journalistic accounts was not reviewed.

5. Humberto Musacchio reports that only 3500 Mexican Army troops were distributed on Thursday, September 19, but 9000 were on duty on Saturday (1986:29). Considerable speculation followed the apparent incomplete implementation of a disaster response program by the military, code named DN-III. Gossip about publicly unreported disputes at the federal cabinet level regarding the declaration of martial law as stipulated by the terms of DN-III, suggest that the debate between the military and civilian politicians was unusually intense. Some observers privately suggest martial law went undeclared for fear of popular resistance, given the spontaneously mobilized rescue brigades and because of an awareness of the military's lack of preparedness for a disaster of this magnitude.

6. A flow chart on page 20 of the Tokyo Metropolitan Government study commission (1986) summarized the sequence of administrative moves pertinent to the disaster. On the following page, there is a summary of the Decreto Expropriatorio. The Japanese seemed impressed by the rather ruthless, authoritarian mode of Mexican public administration.

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EARTHQUAKE, TSUNAMI, RESETTLEMENT AND SURVIVAL IN TWO NORTH PACIFIC ALASKAN NATIVE VILLAGES

NANCY YAW DAVIS
Cultural Dynamics, Ltd.

On March 27, 1964 the Great Alaskan Earthquake struck Southwestern Alaska. Tectonic action lasted four to five minutes and reached a magnitude of 8.4 on the Richter Scale, the greatest earthquake ever recorded in North America. The shock was felt over 500,000 square miles; geologic changes were involved in over 100,000 square miles. Some portions of the earth's crust uplifted as much as fifty feet; other areas subsided as much as seven feet. The shifting of the ocean floor and submarine avalanches in Prince William Sound and the Gulf of Alaska caused a series of tsunami that demolished three Native villages, destroyed large portions of five other Alaskan communities, and caused varying degrees of destruction along the east side of the Pacific Coast rim as far south as Chile.

This paper summarizes what happened in two Koniag Native villages on the southern coast of Kodiak Island before, during, and after this phenomenal disaster.(1) The period of resettlement in the following year is also included. An analysis of the status of the villages, 21 years later, supports the contention that small scale society has a capacity for creative response to disaster, and raises important questions about the role of natural hazards in the history, survival and distribution of human populations.

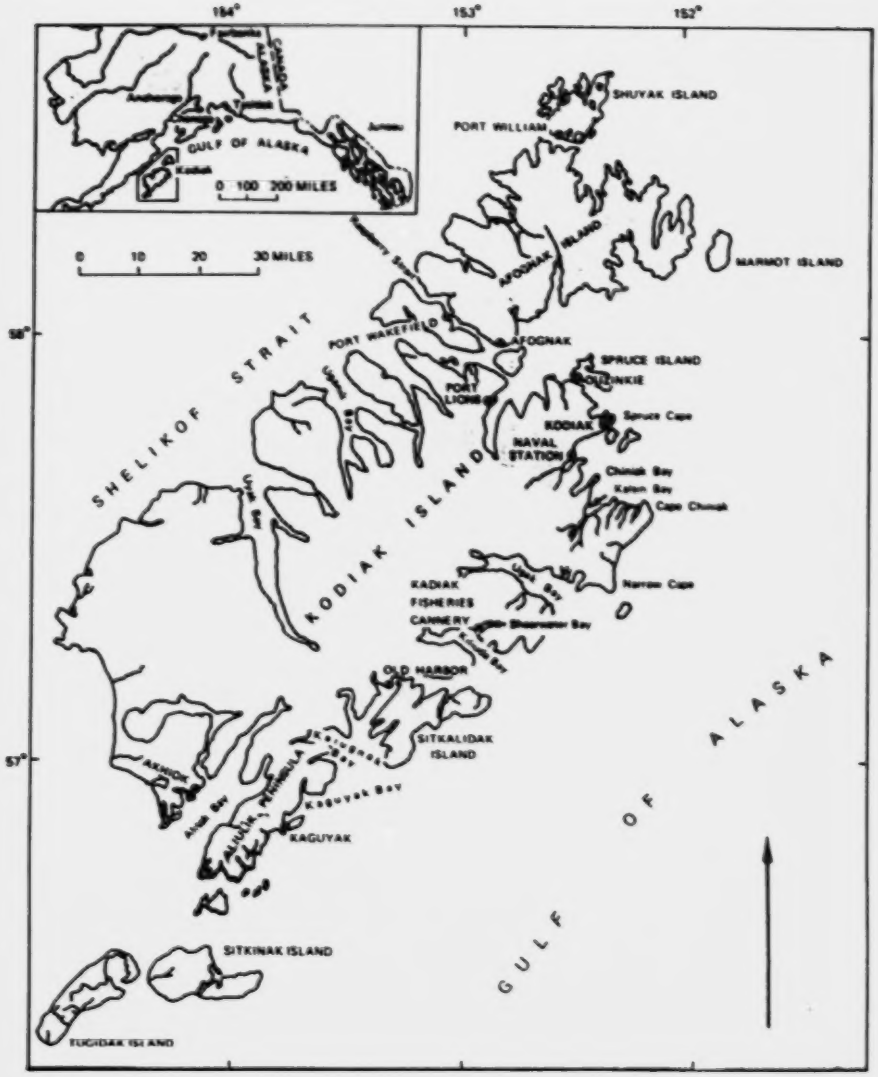
123

What anthropologists can learn in studying communities during an intense period of change may be equivalent to culture change writ large. The opportunity to examine the processes of change is present in the range of responses to each disaster, as is the potential to explore the implications for new perspectives on the human capacity for adaptive change over time. Disaster research provides a ready-made, though unplanned, opportunity to see culture change concentrated in a relatively short period of time. Some communities experience a kind of revitalization following a disaster; perhaps disaster research can help revitalize anthropology as we search for explanations of the social ramifications of the large, unpredicted physical events that have marked human history.

The Villages

In 1964 Kaguyak and Old Harbor were two of eleven Koniag communities on the North Pacific: seven were on Kodiak Island (see Figure 1) and four on the Alaska Peninsula. Little was known about the Koniag at the time and a complete ethnography has yet to be written (Clark 1984; Davis 1984). Indeed, confusion persists about the ethnic identity of the villagers. They consider themselves "Aleut," but their language is Yupik Eskimo. Generations of Russian, Scandinavian and American influences further confound our understanding of them. They are culturally complex, small, isolated, coastal communities.

In addition, in 1964 Kaguyak and Old Harbor, located on the southern coast of Kodiak Island, were among the most isolated and traditional villages. Kaguyak had a population of 36, and was losing residents as children reached school age. Old Harbor, with 193 residents, was growing as it drew residents from other villages. The economy of both was based on the fishing industry and both had strong ties to the nearest salmon cannery. The major unifying institution was the Russian Orthodox church which was maintained by local leadership and local funds. Although there were kinship links between Kaguyak and Old Harbor, and between Kaguyak and Akhiok, (the nearest village to the south), a strong sense of separate village identity was manifest.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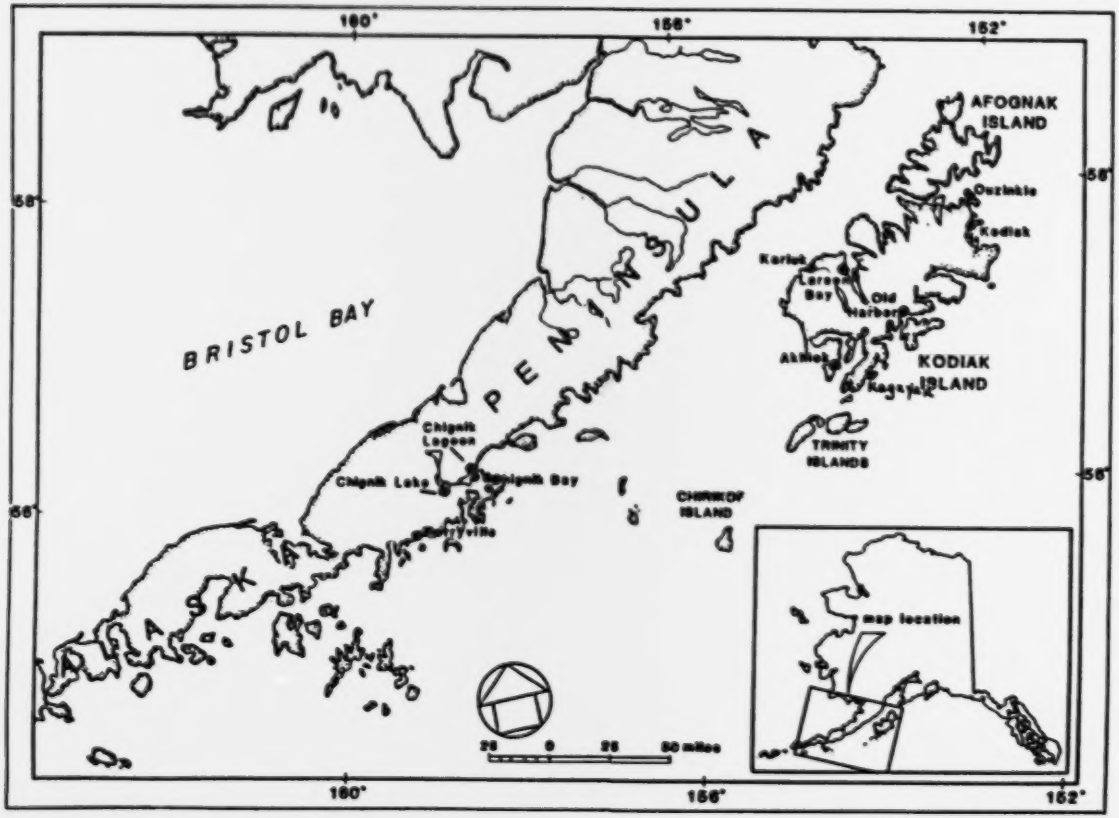
SHUYAK ISLAND
PORT WILLIAM
AFOGNAK ISLAND
MARMOT ISLAND
SHELIKOF STRAIT
PORT WAKEFIELD
AFOGNAK
SPRUCE ISLAND
PORT LIONS
KODIAK
Spruce Cape
NAVAL STATION
Chiniak Bay
Kalsin Bay
Cape Chiniak
KODIAK ISLAND
Narrow Cape
KADIAK FISHERIES CANNERY
OLD HARBOR
SITKALIDAK ISLAND
KAGUYAK
SITKINAK ISLAND
TUGIDAK ISLAND
GULF OF ALASKA

Figure 1: Map of Kodiak Island area, showing locations of the native villages described in the study.

SOURCE: Davis, N.Y. The Role of the Russian Orthodox Church in Five Pacific Eskimo Villages as Revealed by the Earthquake. Page 126 in Selected Studies of Impacts and Behavior. The Great Alaska Earthquake of 1964. Human Ecology. National Academy of Sciences.



Cultural Dynamics 1986

On March 27, 1964, the residents in both communities were actively engaged in spring cleaning, visiting, taking "banyas" (steam baths), and planning to take advantage of the coming low tide for clam digging. In Kaguyak, in anticipation of the coming Easter ceremonies, the men were busy putting the finishing touches on a new church. In Old Harbor, a number of the men had congregated at the pool hall during the afternoon. The community was experiencing conflict over the imminent baptism that day (Protestant Good Friday) of a large local family. They were the first converts to a fundamentalist Protestant church after a long missionary effort. In this strong Russian Orthodox community, much dissension had accumulated around this event.

The Disaster

Late afternoon activities were interrupted at 5:36 p.m. by the earthquake. The shaking was violent, causing minor structural damage to some homes, but no serious injuries. About twenty minutes later, the Kaguyak villagers saw a wall of water approaching from the bay. They evacuated their homes, taking their holy pictures with them, and moved to safety on a hill behind the village. After the first tsunami receded, the local radio operator in Kaguyak warned other villages on Kodiak Island, including Old Harbor, of the high water danger. The people of Old Harbor then evacuated in time to avoid the first tsunami. No damage resulted in either village from this first wave. But other tsunami followed and within a few hours both villages were nearly completely destroyed.

In Kaguyak two lives were lost. Survivors in both villages spent the night on the hills in back of their respective village sites. The following day, all were evacuated by boat to the Kodiak Naval Station where they stayed for a day and a half. Next they were flown to Anchorage where they lived in shelters operated by the American Red Cross. Four weeks later, the Kaguyakans were relocated in the village of Akhiok, and two weeks after that, the people of Old Harbor returned to resettle at their original site.

After the return to Kodiak Island, the residents of both villages lived for eight months in crowded conditions

until new housing was built by the Bureau of Indian Affairs. Throughout the year following the earthquake-tsunami, they experienced the continuing involvement of several agencies in their local personal and community affairs. This intervention was in itself disruptive; thus, in addition to living through a natural disaster, the villagers underwent a year-long rehabilitation period that in a number of ways extended the period of personal and social stress.

A Comparison of Impact and Response in Two Villages

Rather than detail each village's responses separately, I have chosen to describe their experiences of the disaster together in order to draw out significant points of comparison and contrast.(2) To make the comparisons clearer, a time model was derived to divide the sequence of events. The model is taken from one that has been in use since the mid-1950s (Wallace 1956b; Raker, Wallace, Rayner, Eckert 1956; Bates, Fogleman, Parenton, Pittman and Tracy 1963; and Chapman 1962). It is modified here to accommodate the special characteristics of an earthquake followed by a series of seismic waves.

The categories are:

1. **Predisaster conditions**, further subdivided into A, B, and C which become progressively specific as the time of the disaster nears.

2. **Impact I**. The Earthquake, for which there was no warning period.

3. **Post-impact I**, when stock-taking took place and repairs of damages were begun.

4. **Warning**. Unlike the earthquake, the tsunami was preceded by ambiguous clues for those close enough to the beach area to witness water fluctuations, and by specific information (at Old Harbor) for those who heard on the radio of the high water at Kaguyak.

5. **Evacuation**. This is the period of exodus, here locally initiated and accomplished.

6. **Impact II.** Tsunami. A series of destructive waves struck the villages at least four times and then tapered off to small fluctuations in water level.

7. **Isolation:** That period of time after the first destructive tsunami when the people waited for rescue by outside sources. The period of isolation was somewhat eased by the fact radio contact was made and continued after the first tsunami.

8. **Rescue:** When the boats arrived and evacuated the survivors.

9. **Shelter living.**

10. **Resettlement.**

11. **One year later:** 1965

12. **Twenty-one years later:** 1985.

These segments of time provide the framework for reconstructing events and analyzing the comparisons of the two villages.

Predisaster A

While some limited information on the Koniag can be derived from historical documents (Davis 1971:46-66), informant recall of life in the village before the earthquake is a far richer source for understanding contemporary life and culture at the village level.

Overall, the North Pacific coastal rim presents a confused ethnographic picture. On the one hand, the languages of separate groups such as the Tlinget, Pacific Eskimo (now called Alutliq) and Aleut are different, but the archeology and ethnography of the area discloses no clear distinctions (Dumond 1987). Evidence of matrilocal residence patterns are found in some historic documents, such as Davidov (1810-12:23) and Lisiansky (1814:198). A number of anthropologists have been interested in the Kodiak Island area (Hrdlicka 1944; Heizer 1956; Clark 1964, 1984a; Laughlin and Reeder 1966; Knecht and Jordan 1985) but their reports

are primarily studies in physical anthropology and archeology. How relatively little is known about this province of Native North American is documented by Clark (1984b) and Davis (1984).

There is some ambiguity among the people themselves about who they really are. Most still prefer to be called "Aleut," especially since the term "Koniag" has gained, for some, an unfortunate connotation through association with the regional corporation created by the 1971 Alaska Native Claims Settlement Act. This corporation, Koniag, Inc., has been involved in extensive litigation which has dissipated considerable sums of money and caused embarrassment to some of its shareholders.

Kaguyak and Old Harbor shared a common ethnic identity and the sequence of historical contacts was similar for each place. Settlement patterns were similar: houses were located along a narrow strip of land, relatively well-protected from the open ocean; Kaguyak by a peninsula of land and Old Harbor by Sitkalidak Island. But Kaguyak was backed by a lake and Old Harbor by a mountain. For about the last hundred years, Kaguyak had continuous occupation and was dominated by one large extended family. In contrast, the residents of Old Harbor had converged there from several smaller villages and were clustered into two extended families. Old Harbor had been increasing in numbers from 84 inhabitants in 1929 to 193 in 1964. Kaguyak was decreasing in numbers from 52 in 1929 to 36 in 1964, partly due to the lack of a local school.

Two institutions were of major importance in village life: the cannery during the summer and the church year-round. Both communities were tied to the same cannery, but Old Harbor's larger array of institutions (post office, school) provided other sources of employment. Old Harbor also had a cafe, a store, and a pool hall that accounted for some circulation of money within the community. Kaguyak had no businesses and no school. Formal political organization in both communities was weak, but church organization was strong. In addition to the traditional Russian Orthodox parish, Old Harbor had experienced Protestant missionary influences for twelve years and members of four families were attending services, creating some intravillage tensions there (Davis 1970).

In 1964, the villages maintained distinct identities and lived in relative isolation. No roads connected them with any other communities. Radio contact was maintained between the villages and the nearest major town, Kodiak, but travel to town was generally limited to emergency trips to the hospital and to pleasure visits which included buying supplies and participating in "town drinking," which was distinct from "village drinking."

Predisaster B: The Day of the Earthquake

In both villages women were occupied with visiting, preparing meals and, because of the fine spring weather, vigorous spring cleaning. In Old Harbor children were in school part of the day; in Kaguyak, they were not. In both places, the close ties between grandparents and their eldest grandchildren were reflected by an analysis of location of certain children throughout the day. In both, some men were working in their yards. In Kaguyak others gathered at the new church to work on the finishing touches, while in Old Harbor some had gathered at the pool hall which was the men's social center. Steam bathing was also a common, daily pattern for both sexes in both villages. Older men bathe in the morning, the young men follow and the women bathe in the late afternoon.

Predisaster C: 5:30 p.m.

In the moments just prior to the earthquake in both communities most activities were focused around the preparation and eating of the evening meal. Some older children were still outside or visiting friends since children were fed after adults. Those adults not engaged in food preparation, both women and men, report a variety of other activities such as relaxing after the banya, hanging out at the pool hall, clam digging at low tide, reading, listening to the radio, or talking with friends, particularly in Old Harbor about the recent religious tensions.

Impact I: The Earthquake

When the shaking began at 5:36 p.m., persons sitting or lying down were the first to become aware of the beginning of the earthquake; they mentioned it to others, usually to instruct someone to open a door to keep it from jamming. The most frequently mentioned responses in both communities were to open the door, gather up children, turn off stoves and get out of the house. Once outside, some persons in both communities attempted to locate children, even while the earthquake was still continuing (four or five minutes). In both, some individuals reported trying to run during the height of the quake, women from a nearby banya in Kaguyak and men from the pool hall in Old Harbor.

Post Impact I

Actions initiated during the earthquake but not completed, such as reaching home or locating children, continued immediately following the impact. After both men and women took inventory of personal property, the women began to clean up their houses; men and children undertook a general village inventory. In a few cases people even returned to their evening meal. Many turned on their radio receivers, if they were operable.

The more affluent Old Harbor suffered greater damage. Stoves, hot water tanks and chimneys in the newer modern houses needed to be repaired. In both villages, the church became a focus of community concern but in different ways. In Kaguyak where church membership was uniform, the men converged at the new church (where they had been working during the day) to check damages and clean up. In Old Harbor, on the other hand, the church, specifically lax church attendance and defection of Protestants, was seized upon as the reason for the misfortune of the disaster. Disrespect for the Protestant chapel was also cited--by the other side.

Convergence behavior, which is recognized as a universal phenomenon following disasters (Fritz and Mathewson 1957:89), occurred, but given the physical isolation of the villages, only "internal" convergence within the disaster zone was possible. In Kaguyak, men converged

at the church. In Old Harbor, at five key homes and on the beach. Unlike cities, convergence was not a problem, but reflected community centers existing in predisaster times. Where people went, confirmed major social networks in the community.

Warning

Unlike the earthquake, the tsunami at Kaguyak was preceded by a few minutes of advanced warning. A few individuals saw the water approaching and spread the information throughout the village. At Old Harbor the source of warning was from the radio call made from Kaguyak reporting high water. In both villages the radio operator was the only person who can be said to have filled a specific disaster role.

Evacuation

In both communities the response to the warning was immediate; most people hurried to the highest ground, carrying children and some additional items. In Kaguyak the closest elevation was a small hill to the north of the village; in Old Harbor it was the steep mountain bordering the back of the village. Grandchildren aided grandparents, and young men who lingered in the village until the tsunami actually struck had to run from danger. In both villages, the younger assisted elderly and incapacitated individuals to safety. If the tide had been high at the time of the first tsunami, some individuals might not have survived the first wave.

Impact II: The Tsunami

The appearance, height and action of the first two tsunami were similarly described in both villages: the water rose and went over the bank, meandered between houses and receded. The times after the first two tsunami were marked by hurried preparations for staying the night on the hill. In both villages similar items were taken: food, sleeping bags, blankets, baby equipment, and holy pictures. Radio

contact between the villages was maintained, interrupted only briefly during the height of the first and second waves.

The people of the smallest village, Kaguyak, made the greater preparation for survival. They took a tent and a transmitter up the hill. In Old Harbor, the school was counted on for shelter, food and radio communication. Also the steep terrain inhibited transporting large items. About the time the Kaguyak people were moving their transmitter up the hill, the radio operator at Old Harbor was manning his radio on his boat, maintaining contact with villages, the cannery and crab boats.

In both villages some persons reported only three tsunami were expected, yet it was the fourth wave that was most destructive. The marked withdrawal of water far beyond low tide, twice exposing a great expanse of ocean bottom, was noted in both villages. Then the last destructive tsunami arrived. The water built up on either side of the villages, met, lifted up the houses and other buildings, moving them first back away from the bay and then over the bank and out to sea. The actual run-up in Kaguyak was seventeen feet and at Old Harbor twelve feet above high tide level. The tsunami series that struck the two villages conforms closely to other such events in other regions such as Chile in 1960 (Hodgson 1964).

In Old Harbor everyone was safe on the hill when the destruction took place, but at Kaguyak, one man had run through the village to assist a visiting geologist and his wife on a far hill; the three were heading back through the village when they met four men trying to retrieve a skiff and a dory. When the largest wave came up, it caught them all and drew them and the two boats into a great whirlpool in the lake behind the village. The geologist and two village men drowned. A dramatic rescue took place as a local Native man first rescued the geologist's wife and then one of the village men who was thrown in the water from the skiff. In the meantime, on the small hill the rest of the villagers held a service with their holy pictures placed in front of them. "You should have heard the water go out when we pray to God."

Isolation

The period of isolation began after the tsunami destroyed the villages and ended with organized rescue the following day. During that time both villages experienced a long, cold night without adequate shelter. Persons spontaneously referred to the moon and to the cold. Although both villages had the opportunity to evacuate to crab boats during the night, both chose to wait until morning.

Variations of response during this time reflect both the different total effects of the tsunami and certain predisaster contrasts. Kaguyak residents had lost their homes and their newly-built church and the welfare of two village men remained unknown throughout the night. Old Harborites had lost all their homes, except the missionary's, when they were lifted up and carried out with the tsunami, but the Russian Orthodox church and the school structure remained and no lives were lost.

During the night, the Kaguyak people moved to a higher hill; the Old Harbor people moved down to a lower elevation. In Kaguyak a second religious service was held; in Old Harbor some persons checked the church but no service was held. People talked about the miraculous survival of the Church and accusations continued to be directed at the families who had been attending the Protestant services and who were scheduled to be baptized the day the disaster occurred.

Five common patterns occurred before rescue. First, both communities knew they would be evacuated; crab boats were present and waiting. Second, the women did not wish to see the debris of the village or search for personal belongings. Third, men made some assessment of damage and a few goods were salvaged, but efforts were not organized. Fourth, rumors of recurring tsunami continued to frighten villagers. Finally, when dawn broke, some persons in both villages made attempts to find missing persons. One of the Kaguyak men was found, either drowned or dead from exposure. In Old Harbor the search for a white man living alone across the strait on an island was to no avail.

Rescue

When the time came to leave, women in both communities were initially reluctant to come down from the hill to board the skiffs which shuttled them out to the waiting crab boats. In both villages the first instructions, probably originating from the boat skipper, directed women and children be evacuated first, and men later, in western tradition. In Kaguyak these instructions were followed, but in Old Harbor the villagers objected, conferred, and decided families should remain together and the larger families should evacuate first--with their men. In both villages, the women indicated no interest and even marked aversion to seeing their homes, regardless of whether they remained in damaged condition in the village or were floating in the bay. Mention of a great amount of debris floating in the bay was made by men from both villages.

Clear statements indicating the relief experienced once aboard the rescue boats were common to the evacuees from both villages. The Old Harbor accounts tended to be more complete about actually leaving the area; the Kaguyak accounts were dominated with references to sighting their new church on the rocks, and the courageous effort to salvage certain sacred items.

There is little recollection of the boat trip to Kodiak City. Perhaps the survivors were in varying degrees of both states I and II of the Disaster Syndrome (Wallace 1956b). They were still stunned (I) and experiencing the relief of rescue and the accompanying stage of suggestibility (II). They had no idea what was to happen next. As one reported:

> "I knew it would be all right. I slept."

Shelter Living

The two villages were housed together in three different locations: first, the Navy Base near Kodiak City; next, in an elementary school in Anchorage, and finally at Camp Denali, a National Guard camp on Fort Richardson, just outside Anchorage.

Many symptoms of Stage III of the disaster syndrome appeared during the first half of the shelter experience, beginning in Kodiak and continuing in the school. This "Euphoric Stage" is marked by intense altruism, eagerness to participate in repair and reconstruction, and a revival of neighborhood spirit (Wallace 1956b: 109, 110). It was experienced especially by the Old Harborites. In Kodiak there appeared to be a feeling of "going with the people," wherever they happened to be sent.

At the school in Anchorage, Old Harbor residents experienced renewed unity; the conflict over the defection of some residents to the fundamentalist church had been resolved (at least temporarily). The village was once again all Russian Orthodox; the earlier disruptive conflict resolved.

In contrast, Kaguyak community spirit declined and the Kaguyakans appeared discouraged and indifferent to what was happening to them. One family decided to relocate in Old Harbor and the rest in nearby Akhiok. They seemed to passively accept the splitting and dissolution of their community. The predisaster "neighborhood" community-wide Kaguyak spirit of unity did not revive after the disaster. They had lost two key men, and their church, and, in the words of the elderly lay reader, "Number One Place, Kaguyak, was gone."

Although the villagers emphasized individualism and independence at home, there was no indication that they defined the disaster aid that was given to them as charity or regarded it negatively, a reaction reported elsewhere (Bates et al. 1963:57). To the contrary, some people appeared angry it was not of better quality. Indeed, the distribution of goods caused considerable contention between the two communities. Each felt the other was receiving more than its share. In contrast with the victims in the Bates et al. study, where the possibility of outside aid did not occur to the people and where charity was not desired or easily accepted, the Alaskan villagers seemed more quickly to recognize the potential of Red Cross and BIA aid. Perhaps receiving goods from agents of the dominant culture was a part of contemporary village life, and concepts of giving and receiving may have been distinctive here. The agencies' obligation is to give; the villagers' responsibility is to receive.

The flow of goods to the Red Cross-operated shelter in Anchorage was part of a larger counter-disaster syndrome. People experiencing guilt from their own good fortune of having survived the disaster often rush to be of help. "One might say that the area was stacked high with people and material trying to be of service" (Wallace 1956b:101).

Once in Anchorage, the Kodiak Island villagers were subjected to the efforts of many persons displaying these symptoms of the counter-disaster syndrome. From a villager's standpoint:

> "They were just pouring in here. They finally had to put a sign outside for people not to bring any clothes and stuff."

The fourth stage of Wallace's disaster syndrome is the "ambivalent stage"; it emerges when the euphoria of survival wears off, annoyance over the long-term effects of the disaster are realized, and discontent, criticism and complaints become prevalent. As in other disasters (Olson 1960:173) shelter food became a focus of complaints. When some of the more wealthy villagers realized that everyone was to receive the same goods, regardless of how much they actually lost, resentment set in. Conflicts between agencies and conflicts over financial assistance arose. People became irritated with the minor frustrations of shelter living, and the vulnerability to rumors was so great, the shelter leaders found it necessary to limit visitors.

Resettlement

Resettlement was a continuation of the disaster. In many ways it was more disruptive than the original natural catastrophe. For the Kaguyakans the relocation was especially difficult. One family of six moved to Old Harbor; the other 28 survivors were relocated in the village of Akhiok, then a community of 84 residents. The Kaguyak villagers were invited to come, but arrived before arrangements had been made, and they moved in on Akhiok families in already crowded homes. The Old Harbor people, after token discussion and despite voiced reservations, were resettled at their original site, near tide level.

The first eight months of resettlement was a period of great discomfort and stress for both villages. As noted, the Kaguyak survivors were crowded into host homes barely adequate for the regular residents. Old Harbor villagers had private tents, but they were small, drafty, cold and damp much of the time. Both groups recalled the year was marked by frequent illnesses.

Ultimately similar housing was built for both groups: 44 houses in Old Harbor in 6 suburban-like rows, a few feet above sea level, and 7 houses in Akhiok back on the tundra adjacent to the host village. The design was inappropriate for the area, having been done by the BIA, reportedly in Albuquerque, New Mexico. The houses had bedrooms, thus separating sleeping areas; small kitchens; and relatively spacious living rooms. The kitchens, center of many activities, were much smaller than the ones they replaced; the living rooms were not often used, in 1965 some served as work rooms for building furniture and for storing outboard motors and case goods. The homes had bathrooms, but construction was generally poor and there were problems with the plumbing. Steam bathing was still preferred over tub soaking so bathtubs were filled with canned goods. Only oil-burning stoves were installed, so heating expenses greatly increased. One young wife declared:

"Never be enough money for this house."

Dissatisfaction with government-supplied housing and changed residential patterns have been reported by Fernea and Kennedy (1966:351), Iverson and Matthew (1968:141), Niehoff (1966:118), Kiste 1968:254, 272), Knudson (1964:153) and Oliver-Smith (1986:140-141).

One Year Later: 1965

The pervasive atmosphere in both the Kaguyak-Akhiok and Old Harbor communities during May, 1965, was one of disillusionment and discouragement. The Kaguyakans were angry with the Akhiokans; the Akhiok hosts were envious of all the attention, goods and housing the Kaguyak survivors had received; Old Harborites were angry with the agencies and with each other.

Clearly most villagers did not wish to return to the exact site of destruction; aversion to even looking at the debris was indicated when they evacuated. Initially, the Kaguyak survivors indicated no interest in returning to their former site, though later they said they did not believe they even had the option. Old Harbor developed an early and continuing interest in relocating at a different, though nearby site, but their efforts even to review the possible alternatives were thwarted, and they reluctantly returned to the exact same location. At least their church was still standing. However, this decision was not completely accepted by 1965, as is indicated by the near segmenting of the village in the summer of 1964 and the continuing discontent expressed in 1965.

Factors the villagers identified as important in site selection reflected important predisaster values, such as the beach, water supply, winds, space, availability of schools and the church. Analysis of the factors ultimately influencing site selection reflected the significance of informal leaders of large segments of kin.

Twenty One Years Later: 1985

By 1985, the forces that led to the demise of Number One Place, Kaguyak, had run their course. The village never was resettled; the original residents were dispersed to four different locations: Old Harbor, Kodiak, Port Graham and Akhiok. All five of the elders had died, and additional deaths claimed four more of the original residents. Tragedy seemed to strike Kaguyakans often. The distinguished lay reader perished in a fire, several men drowned. One family moved to Old Harbor, the wife left and suicide claimed one of the children. Two families moved to Kodiak, where the former chief holds a job as garbage collector at the Coast Guard Base, and his wife works as a maid in a local hotel.

The Kaguyakans who stayed in Akhiok remained an identifiable social group, and are still called "The Kaguyak Bunch." Only seven of the original survivors lived in Akhiok, but the total direct descendants numbered 27. The women had married local men, and all were active in the church. The direct contribution of Kaguyak to Akhiok in numbers alone was 28% of the village Native population of

96 (of a total of 102 residents). None of the Kaguyakans owned fishing permits or a fishing boat, but they were active in a community that had among its amenities 10 three-wheelers, 1 truck, 17 skiffs, 32 dogs, 6 cats and 11 VCRs. And the Kaguyak people all lived in fine new houses built by HUD, complete with running water and electricity (Davis 1986).

In 1985, the Old Harbor population was 337, the largest Koniag village in Alaska. Three federally-funded housing projects, and a state-funded new boat harbor and high school had been built. Available in the village were at least 59 jobs, most of them part-time. In 1965 the villagers owned eight boats; in 1985 they owned 25, and 29 men held highly valued limited-entry fishing permits. The average gross earnings for Old Harbor fishermen was $31,500 in 1983, the latest year for which income data are available; during the height of crab harvesting in the late 1970s it was estimated at $83,400. The local businesses, including two stores, a restaurant, and a fuel oil distribution company, were all Native owned. Although it was still a one church community, several Natives now professed the Mormon faith (Davis 1986).

Conclusions

The comparison of the narratives from the two villages sheds light on several aspects of culture change. The people displayed considerable adaptability to new conditions and the culture revealed flexibility in the face of the catastrophe. Yet despite material and technological changes, few alterations in the social structure followed the disaster. A predisaster trend toward decline in Kaguyak was accelerated: the village was abandoned. On the other hand, the predisaster trend in the direction of growth in Old Harbor was enhanced: by 1970 the population was 290, an increase of nearly 100 people. In 1985, the community continued their lead as the largest Koniag village.

Before the disaster there were economic differences; immediately following it, the differences were in many ways leveled. Although this equalization of distinctions in wealth was temporary, an increase in felt needs for cash was permanent, as was the decrease in mutual aid within both

communities. Links to the world beyond the village were enhanced by the disaster experience, and permanent agency involvement persisted over time. One can speculate that this would have occurred eventually given the wealth later accruing to the State of Alaska, but the ability of Old Harbor especially to manage outside agencies seemed more developed than in other nearby villages that did not experience the tsunami, such as those on the western side of Kodiak and on the Alaska Peninsula.

Increased political awareness beyond the village was an irreversible and accelerated change. However, the preference for independent decision making and reluctance to allocate authority to a central council or person persisted into the 1980s. But the marked increased of bureaucratic involvement in village affairs was irreversible.

The establishment of more neolocal residences was accelerated in Old Harbor as a direct result of the increased number of houses available. The rearrangement of houses allowed a reclustering of matrilineal kin, which was the reconstitution of a former pattern. Every change of residence between 1964 and 1965 indicated matrilocality was preferred; no locations were changed on the basis of patrilocal preference. Although permanent changes occurred in the location, visual orientation and internal space allocation of housing, three areas could be identified where no change came about. In each home, a corner was devoted to the family's religious icons, social activities continued to center in the kitchen, and banyas (steam baths) continued despite the availability of a bath tub.

Changes in community facilities, some of which were desired in predisaster days, resulted from the catastrophe. The disaster provided the context and rationale for such improvements as the introduction of water and sewer systems. Community power plants were introduced in the disaster villages before others in the area.

The identity of the Kaguyakans as a distinct social unit was threatened by their relocation, but their vulnerability was somewhat lessened by the special attention they received from agencies, especially compared to Akhiok residents. Twenty one years later their identity remained intact. Old Harbor experienced an increased sense of unity

following the resolution of its internal religious conflict, and the sense of being a special, growing, promising and friendly village was encouraged by outside agents. Identity changes in the direction of an increased sense of unity have also been reported for the resettled people in Nubia (Fernea and Kennedy 1966:353, 354), Tonga (Colson 1967), Bikini (Kiste 1968:162) and Yungay (Oliver-Smith 1986). In both Alaskan villages, the disaster led to reaffirmation of religious identity. Russian Orthodoxy was confirmed as preferable to anything else. In this dimension, a previous commitment was strengthened.

In summary, four changes in attitudes occurred as a direct result of the rehabilitation agents and processes. They were:

1. Increased political awareness of the state and nation.

2. Enhanced sense of ethnic identity.

3. Greater knowledge of the availability of social services.

4. Increased dependence on governmental agencies.

A question can be raised as to what extent the disaster hastened changes already underway in the pre-disaster period. Would the site of Kaguyak have been totally abandoned eventually? It seems not likely. The residents loved their village too much. However, unless a school was built there, it might have become a summer village with only a few residents spending winters there--until the children grew up, married and returned. There was evidence Kaguyak was becoming a summer community; what the disaster did was eliminate its continuity as a physical location. Even so, the social identity continues 20 years later.

Would Old Harbor have fared so well in applying for and receiving state and federal projects, grants and jobs without the experience of the disaster? This was a progressive community before the earthquake; it continues to be one. The basic political skills of dealing with agencies learned by the chief, now mayor of the village, was

enhanced. The speed at which the village modernized was increased as a consequence; the disaster gave an additional push to a direction already connecting the village with the larger world in new ways.

One result of this study of Old Harbor and Akhiok has been to reflect on the complexities and difficulties of relocation and resettlement of small communities of the modern world. No longer can an isolated community within reach of the western world suffer a disaster and then be left to recover by its own resources. Rather, the recovery and rehabilitation are directed by agencies whose specialized and immediate purpose is to help such communities. Recovery can be further complicated, as it was here, when agencies representing one culture reach "down" to help peoples of another culture, directing them to participate in modernity at a time when the people are assumed to be most amenable to such suggestions. A community initially struck by a natural disaster must also cope with a series of additional disturbing experiences. People and societies are seldom left to make their own decisions subsequent to disasters or even temporary bad luck. There are now numerous agencies in the larger world designed to deal with these aspects of the human experience.

Disasters and Culture Change

In his classic study of the Halifax explosion, Prince raises the question, "How much of man's advancement has been directly or indirectly due to disaster?" (1920:22). The literature on change resulting from disruption reveals two opposing points of view: one group including Hagen (1962), McClelland (1961), Goodenough (1964), Barnett (1953), and Smelser (1959) support the general proposition that when a cultural system receives a major upheaval, the people are more susceptible to change. In contrast, Wallace (1956b), Bates et al. (1963), Marris (1975) and Oliver-Smith (1986) anticipate that cultural upset will more likely lead to a conscious effort to re-establish the former order. Oliver-Smith (1986) following Marris' lead (1975) demonstrates in the specific context of the Yungay avalanche disaster that the effort to reestablish the former order enables people to structure the chaos of post-impact and reconstruction experiences in terms of known categories, thereby permitt-

ing a more successful negotiation of the difficult adaptation to major change.

Barnett (1953) anticipates resettlement will have an unsettling effect and people will be more susceptible to innovation because the former cultural values will be rendered inoperable. Our study reinforces the findings of Marris and Oliver-Smith in that it indicates that old values did not become inoperable, but rather shaped responses to changed conditions, and in some cases resisted marked structural change as in the reluctance to change the structure of decision-making authority. In effect, the experience of the villagers of Kaguyak and Old Harbor illustrates the crucial role played by pre-impact culture in coping with major disruption and adapting to changed conditions.

Finally, we must ask: what relevance to larger historical processes in human history might be learned from the experience of Kaguyak and Old Harbor? Disasters have periodically eliminated communities, dispersed some, and led to greater consolidation of others. If we were to study the great human disasters in history, would we learn more about those phenomena that seem to lead to new arrangements, social and political, and new economic networks between communities? Are disasters to human society what mutations are to genetic structure? That is, just as mutations can be good, bad, or neutral to the survival of the species, so, likewise, can disasters be good, bad or neutral for the health and survival of human societies?

NOTES

1. Partial support for the initial research in 1964 was received from the National Science Foundation; The Ohio Disaster Research Center supported the research one year later. Subsequent opportunities for short visits and updating were provided by the Joint Federal-State Land Use Planning Commission for Alaska (in 1975), and by the Social and Economic Studies Program of the Alaska Outer Continental Shelf Region of the Department of the Interior (Davis 1979; 1986). This paper was edited by William E. Davis.

2. **The Data**

Information about the events of the day of the earthquake and about the disaster itself was gathered in Anchorage beginning eight days after the event. Since I lived a few blocks from the school where the villagers were sheltered, and the university where I was teaching was temporarily closed, both an unexpected ready-made research opportunity and the time to do something about it was on hand. After designing a few selected questions and assessing the situation, I proceeded to interview as many of the survivors as possible. They were able and willing to recall an amazing amount of precise detail about the events.

In all, 53 (70%) of the 76 Old Harbor adults were interviewed; they lived in 32 of the 35 households. There were 8 households and 16 adults in the Kaguyak group; 13 (83%) of the 16, representing all 8 households contributed. Of the 227 persons in the combined villages, 81 (36%) were interviewed, including some children. Of the 92 adults in the combined villages, 66 (71%) participated in the research. A total of 40 of 43 households were represented by one or more persons. Most of the discussions were tape recorded, supplemented with shorthand notes. The National Science Foundation (GS-503) supported the transcription of this material.

One explanation for the amount of detail and success of the research effort was the fact the people had little else to do in the shelter. Furthermore,

there may be therapeutic value to talking about a disaster (Chapman 1962:324). Overall, the villagers were eager to talk about the event. I remember being surprised how easy it was to establish rapport, and how keenly interested most people were in getting their story recorded. One result was a nearly complete reconstruction of the major events on the day of the earthquake and during the subsequent evacuation.

A year later the primary data were supplemented and expanded by research from the Ohio Disaster Research Center (Grant No. MH-1155801) which included these two villages, and three other small communities in the North Pacific (Norton and Haas 1970). This follow-up information, which is rare in disaster research, revealed how the original event continued to be felt, albeit differently, in each village, and disclosed the ramifications of the resettlement efforts (Davis 1971). Later research under other projects allowed some continuity of assessment of the long term effects of the disaster (Davis 1976; 1979; 1986).

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ALGAE:
A MINOR DISASTER IN THE JEZREEL VALLEY, ISRAEL

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INTRODUCTION

The disasters that have been the subject of most "hazards" research(1) have been major, life-threatening events, involving famine, homelessness, and other devastation. But minor disasters or crises are far more common, and sometimes have far-reaching, cumulative effects. These events provide a context for examining complex interactions between different groups of people, and between people and their resources, as they respond to their various ways to unforeseen disruptions.

The subject of this paper is one such minor disaster. After describing what happened, I will present the historical context of the events that led to the crisis, and analyze the responses on the part of the different actors to explain the nature of those responses. Of particular interest is the question: why were the responses as rapid as they were? This is because, in this instance, the speed of response was particularly striking. Finally, I will conclude with an effort to evaluate the "appropriateness" of the response, both by theoretical indices and in the context of that actors' own circumstances.

The Algae: A Short-Term Minor Disaster

On June 12, 1985, treated effluents from a new large reservoir (Maleh Kishon) were first combined with fresh water from an older reservoir (Kfar Baruch) and piped to extensive agricultural fields for irrigation, in the Jezreel Valley in Northern Israel.(2) By June 25, water pressure problems were being reported by farmers, and by mid-July, it was realized that a minor disaster was under way. Algae had grown in the mixture of fresh and treated sewage water, and had clogged the irrigation drippers that deliver water to plants in the fields. For a variety of reasons, the delivery system broke down, with the result that the major cash crops in the region were deprived of necessary water during a critical point in the growing season. The consequence was the loss of much of the season's produce, a financial disaster for many of the farmers in the region. There is no precise calculation of the dimensions of the loss--for some farmers, it was a loss of only a few hundred pounds of cotton that they had been counting on to make the crop pay, while for some others, a total wipeout of the grape crop. Nobody starved, nobody died.

Indeed, some might not consider this a real disaster. But many local farmers did; members of one community felt so victimized, that they threatened the local irrigation manager's life. The worst day of the water failure acquired the name "the Black Saturday," and wives told stories of how their husbands ran in despair to the fields every two hours, night and day, to clean the filters. A local irrigation manager recalls the experience as completely devastating. In the victims' perception, then, the event counted as a disaster, even though all that was lost, in the end, was money.

The period of water deprivation was relatively short. By July 19, the effluent reservoir pipes were closed; on the 22nd, a committee of experts convened to initiate, the same day, research on the problem with a search for immediate solutions. The first week in August, new filters had been installed in some areas, and more were added during the month. By the beginning of August, irrigation had been restored, though now it was strictly regulated by the national water supply company, Mekorot, and delivered to villages by rotation, not continuously, as had been the case

previously. And by mid-August, the disaster was no longer a topic of general conversation in the villages--it was all but forgotten by the end of the month, after the harvest.

Origins of the Disaster: From Whose Perspective?

This is an instance of a disaster whose origins lie in intentional human actions whose consequences were unanticipated. Technical experts and official water managers intended to provide an additional source of water for irrigation, farmers intended to irrigate their crops. The first resulted in an unforeseen environmental event (see Lees and Bates, 1984, on the subject of such "events") a rapid expansion of an algae population, the second, in the clogging of irrigation equipment. According to government analysts, it was a management-related disaster, an instance of a "tragedy of the commons" (Hardin, 1968). They claimed that the algae would not have been a problem, had the farmers not been using too much water, and using it all at once, so as to lower the water pressure to the point where their filters could not effectively handle the impurities in the water. Local farmers and managers, however, saw it largely as a technical failure, resulting both from inadequate knowledge of the nature of the new water resource, and inadequate preparation in that more effective filters could have been made available and weren't--at least on time. The scientists and engineers also treated it as a technical problem, and decried inadequate research on materials used for irrigation pipes and filters, an inadequate coordination of prior research. All these perceptions were acted upon immediately by the different groups who held them: water use was more carefully regulated, new filters were installed, and a program of coordinated research was initiated.

The short-term consequence was that use of the new resource was restored, and farmers went on irrigating their now reduced crops with the expectation that the following year, things would "return to normal." However, this was probably a misperception, as we will see.

Intermediate-term consequences were various. One was, as a result of the research that was initiated after the crisis had occurred, amplification of knowledge about technology and irrigation practices. Researchers concluded,

in a meeting the following January, that the type of filter most effective and appropriate for local circumstances and this will, in the future, be the preferred type; another, which was believed effective, was found to be less favorable, and will no longer be relied upon. Other things being equal, it might have been possible to evaluate the effects of this change. But other things were not: January's decision was considerably overshadowed by another unforeseen circumstance. January brought no rain -- nor did February or March.

The Social Context of Disaster: Managing the Commons

To return, now, to the algae-related minor disaster with which this paper opened, we may ask how it was that this event occurred, why it elicited the responses it did, and why its duration was so short. Following the example of other current researchers in the area of hazards, we look to the social context of the events here described, and also place them in the context of other hazards and disasters with which the participants have had to contend. In this analysis, I will be emphasizing factors related to what Hardin and Baden (1977) have referred to as the problem of "managing the commons."

This problem arises when a resource, like water, is designated as "public" property, and exploited by members of that public as individuals. If these individuals follow self-interest, and exploit the resource without constraint, they will cause damage to the resource itself -- ultimately making that resource useless to all. Managing the commons means establishing rules of exploitation to prevent this outcome. Through time, rules may change, or understandings and interpretations of these rules may change, as other circumstances of the actors themselves are altered, even by the use of the resource. Here, I will try to show how shifts in people's activities and attitudes have mutually created and diminished hazards related to irrigation in the Jezreel Valley.

What Led to the Algae Crisis?

A number of influential writers in the field of hazards research have attributed the extent and scale of various different types of hazards to capitalism and individualistic profit orientation (hence overexploitation) with which it is associated (see Hewett, 1983). To a certain extent, this case supports their point, and to a certain extent, it does not. It does not, in that there is no private property; virtually all land and water in the State of Israel are state-owned, and this applies to the Jezreel Valley, of course, as well. This puts some major constraints on people's disposition of these resources--the "public," in the guise of government officialdom, can and does exert control for the greater good.

Furthermore, in this region, all farming settlements are one or another form of cooperative.(3) A large minority are kibbutzim, collectives. The majority are moshavim, smallholder cooperatives. They are connected to one another by belonging to one or another settlement movement. While a number are veteran settlements, established in the period from the 1930's to just before Independence, most were settled by immigrants who arrived after the establishment of the state. Most of these "new immigrant" settlements remained for a long period under the tutelage and protection of the Jewish Agency, and a number remain so today. Not only was the initial capital input required to prepare the land for cultivation subsidized by the Agency, but all farming, whether under the guidance of the Agency or not, is heavily government subsidized, from the cost of water, to the prices of crops. The subsidies, the guidance and protection of the Agency, and the fact that these are cooperatives, belong to cooperative organizations, all constrain "individualistic, profit-oriented activity." While, as I shall explain below, behavior does not conform to the rules as they are written, members of these cooperatives are presumably obliged to take group interests into account. Water is delivered to the cooperative as a whole, to be shared equitably among its members. Farm produce is marketed cooperatively, and gains from farm production are used at least in part to support cooperative needs and functions. Consequently, the case we are examining is not a clear-cut instance of capitalistic entrepreneurship--it is constrained by a cooperativistic structure.

There are, however, strong motivations for cooperative farmers and collective farm communities to act in individualistic, profit-oriented ways, despite the socialist institutionalization of agriculture in general in this country.(4) It is from this combination of profit-seeking and exploitation of resources which are not privately owned, that the problem of the commons arises. Israeli farming is, of course, far from unique with respect to a concern for private profit in the context of socialist organization. The same has been noted elsewhere in the world, including Mexico, East Europe and the Soviet Union, and the Peoples Republic of China. Products marketed through the cooperative are subject to the control of others--the cooperative functionaries and others who hold them to account such as banks, the government, and so forth. The earnings of these products are likely to be applied to payment of debts of the cooperative as a whole, or of individual members to the cooperative, or to investments for the benefit of the cooperative as a whole, before being distributed to members, if anything is left, to make use of according to their own priorities. For this reason, members attempt to bypass the cooperative organization in various ways.

Even so, farming does not pay its own way, nor does it provide adequate income for most farming families (or communities, in the case of the collectives) to support life at expected standards. Some two-thirds of the workers who live in farming communities actually make a living by working full time at something other than farming. In small-holder settlements, this means that most so-called farmers work full time at off-farm jobs, tending to their farms on a part-time basis, using hired labor (contrary to the principles of cooperative membership). The fact that small-holders are off the farm much of the work-day contributes to a certain sloppiness in farming and water management, except for those who can afford to invest in automated irrigation devices; then again, the use of such devices was encouraged by the practice of "part-time farming." These devices have the advantage of providing the potential for water-saving and are also greatly advantageous for energy-saving. The primary concern of the farmers, however, is likely to be savings in labor. Farmers might save money on water charges too, if these are charged to them as individuals; if not, this provides little motivation. Conserving water for their neighbors, not to

mention the wider public, however, does not motivate them, unless other constraints and incentives make it so.

There are, on the other hand, some powerful incentives to farmers to attempt to use water efficiently. Although water is subsidized, the cost to the farmer is still high. Second, crop productivity reflects efficient water application, and the farmers want to increase productivity for overall gains. Third, it is scarce. Each community has a quota, and financial penalties must be paid by someone for water use in excess of the quota.(5) The high cost of scarce water, and the desire to produce at high levels, have led to the nearly universal use of water-efficient technology, particularly drip irrigation. Low-cost loans from the government to increase water-efficiency are further incentives for the adoption of this technology. These incentives themselves do not, however, account for the nearly universal adoption of drip irrigation. To be sure, drip irrigation is recognized by the farmers to be a water-efficient method; a large proportion, nevertheless, emphasize labor-saving as their primary consideration. It is they who provide labor, on a private basis -- their own, or that of hired workers whom they pay themselves. Together, the various incentives and motivations to use drip irrigation resulted in a high degree of dependence on this technology. It was this that resulted in the vulnerability of the farmers to the algae disaster.

In part, their vulnerability was also due to other technology and certain related farming and management practices. Irrigation water in Israel is all provided by pressure, which pumps water from its sources to the farming communities and to the farm gates. Although all water used is metered, the farmer can generally turn the water on or off at the farm gate at will and this permits individualistic exploitation of the "commons." The national water company, Mekorot, is responsible for providing the water and managing the facilities, but communities themselves are responsible for allocation of water among their members.

While quotas provide a ceiling for how much water should be used, because the only penalty for overuse was a fine applied on the additional use, the farmer might calculate whether or not it would be worthwhile to pay the extra cost of going beyond the quota. In 1984, for example,

a year of low rainfall, virtually all communities in the region went over their quotas. No farmers or community irrigation officials ever mentioned as among their own considerations regarding water-use, the cost to others of over-using their quota of limited water. Their only considerations were individual need and cost.

Because the area is nearly monocropped in cotton and tomatoes, all farming communities needed and used the water simultaneously. (The planting regime requires very precise timing; these two crops are cycled with other winter crops, and this the growing season for them is very short.) As a result, water pressure dipped, and the consequence of this was that local filtering systems were inadequate. Consequently, when the algae filled the supply lines, farmers were using water at a very high level, and responded to the "shortage" of water induced by the clogging of the dripper lines by using yet more. There was nothing to stop them.

The kibbutzim (collectives), with their pooled resources and generally higher community-level incomes, had earlier, and even at that time, been able to invest in pressure boosters, which increased the effectiveness of their filtering systems. Some of the wealthier small-holder cooperatives did the same. But the poorer, run-of-the-mill and small-holder settlements had neither the degree of cooperation, nor the level of funding necessary to make such an investment--not surprisingly, they were the most vulnerable, and suffered the most.

The simultaneous over-use of irrigation water laid the background for the algae crisis. But this particular crisis would not have occurred had the farmers not been using the treated water from the new reservoir. The question of why the region had come to use the new water supply, which was the direct source of the algae, also needs to be addressed. Local water sources are plentiful here, and most water is supplied, in addition, from the national carrier, which provides water for the whole country. What was the need for a new source? About 16 years ago, a regional water-users interest-group was formed under the leadership of a charismatic local farmer. Their concern was for the future: they anticipated that, some day soon, water would be diverted from the region to other parts of the country, and from agriculture to other sectors. They were deter-

mined to be autonomous, to escape from dependence on the national water company and the national carrier. Initially, they began to provide services to local communities to tap local sources--seasonal runoff, effluents, springs, and so forth. In 1985, there were some 72 small reservoirs serving local communities in the valley. The large reservoir was the product of many years of planning, its history dating to the formation of the regional association. Farmers believed that this new source would be more secure than sources dependent on rainfall, since sewage would be produced from the city regardless of rainfall levels--it would always be available, and there would be no competition for this water from the urban sector, which could not use it cost-effectively anyway. While they anticipated that their share of the national fresh water resources would be cut, they were certain that they would retain access to all the treated water. The new reservoir was a "future" substitution for fresh water which they believed would be taken from them. They were eager to have more local control, to insulate themselves from the needs and demands of the rest of the country, should national priorities differ from their own. For these reasons they consented to support the project of building the reservoir and use its water, though they knew it might entail some unknown, unforeseen risks as a new, untried resource and supply system.

Why Was the Response to the Algae Crisis So Rapid?

If this is what led to the hazard, then what was it that governed the response to the ensuing disaster--its form and duration? No one in the area had had any previous experience of such an event, nor had any such thing taken place elsewhere, so there was no past pattern of behavior to draw from [illegible] running to their [illegible] could. Some reported [illegible] irrational things like detaching their [illegible] which only hastened the destruction of their drinking [illegible]. Almost as quickly, the local water [illegible] help by providing [illegible] and attempt[illegible] The[illegible] sca[illegible] resp[illegible]

problem, the new reservoir, and return to full dependence on the fresh water reservoir. The national water company, to whom the problem was reported immediately, promptly established a system of rotation in the irrigation system, so that even communities without boosters would have sufficient pressure. While this was happening, experts were mobilized to research the problem for longer term solutions. The duration of the crisis was no longer than two or three weeks at most; immediate solutions were provided during a period of a week or two; and longer-term solutions were offered by six months later, as a result of research and trials.

1. Ideology

Responses to water supply problems in Israel are notably rapid. Expert and lay mobilization is not only rapid, but facilitated by institutional organizations which provide for a continual state of readiness. This sort of rapid response has only one counterpart in the country, the military. Other matters receive no equivalent attention, nor do they elicit the same sense that they must--the postal and transportation system, telephones or construction, or anything else. Water, however, is not only important for agricultural production, it holds a special place in the ideology of the country. It is associated with the Zionist imperative of restoring the land of Israel, by "turning the desert green." Once truly scarce, its respectful treatment, and all efforts to prevent waste, are regarded as patriotic acts, within reach, even mandatory, of all citizens. While actual behavior deviates from the goal, the ideology is not only known to every schoolchild, but is reflected in the character of professional water management.

2. Expertise

That the country should have a high degree of expertise in water management might not be surprising in view of its dependence on this scarce resource. But other regions of the world, in a similar position, have not developed nearly the expertise of Israel. Because of the high social status of agriculture in general during the early development of the state of Israel, and particularly of irrigation through modern methods, many of the most capable young men of the country were attracted to the

professions of water management, such as hydraulic engineering. Communal farms, capable of freeing up members to study specialized fields, invested in the education of selected members in the area of irrigation technology. In order to meet their own needs, and to apply their expertise, a number of communal farms established irrigation equipment industries. There are some 80 of these in the country now, producing state-of-the art equipment. As a consequence of these various factors, there is a high level of expertise in various sectors-universities, research institutions, government agencies, industry, the national water company, Mekorot, the national water planning agency, TAHAL, an irrigator's special interest-groups organization (the Israel Water Workers Association), regional water users organizations, and local communities. These experts are tied together not only by mutual professional interests, but also by government procedures which mandate the participation of members of these various sectors in committees which determine water policy and monitor the development of new technology. So, they communicate frequently, know one another, and are accustomed to working together.

A final point: contrary to the case in many developing countries, experts and authorities here have no objection to performing manual labor themselves. Many of the experts are, or have been, farmers themselves. As noted before, there is high prestige associated with farming, as well. Consequently, when a problem in water control is detected, and an expert called for assistance, the expert does not order some manual worker to carry out repairs. The expert goes, himself or herself, examines the problem, and where possible, acts on it personally. No time is wasted on indirect communications. Thus, when the meeting of experts was called in the case of the algae crisis, the participants themselves went out directly after the meeting and initiated the necessary experiments on location, installing sample pipes made of different materials, and so forth.

3. Communication

Channels of communication between farmers and experts are simplified by technological means. Telephone and radio communication are available to all farmers, who can be certain that there will be someone at the other end to hear and answer their calls. Ongoing two-way communi-

cations between them and experts are also facilitated by the monitoring procedures of government agencies, the water users associations, and manufacturers representatives, who regularly visit farms and farm communities to check on the operation of new installations, give advice on planning, and so forth. So problems are detected rapidly, made known to experts rapidly--hence the possibility to act on them rapidly. Finally, water metering provides an important source of knowledge. The meters are generally checked on a monthly basis, farm by farm at the settlement level, and community by community on the regional and national levels, so that unusual patterns of use are readily detectible. Though it usually does not take as long as a month to detect a problem, analyzing its source may be assisted by knowledge of these patterns.

4. Political Environment

Enhancement of efficient water use is a national priority. It is written into the water law of the nation, and implemented in part by a division of the Water Commission called the Division of Efficient Water Use. That this priority is associated with agricultural water use may be represented by the fact that the Water Commission (which regulates water use in all sectors) is housed in the Ministry of Agriculture. Thus, it is in irrigated agriculture that most of the expertise is concentrated. One government expert claimed that while water use management in the agricultural sector is in the 21st century, in the urban sector, it remained in the 19th century. Implementation of government concern and expertise, then, has so far concentrated on irrigated agriculture.

Under these circumstances--the high degree of expertise, the relatively large number of experts, and their distribution in various institutional settings, the political environment which places a high priority on control of waste, and the ideological environment which awards special stature to water itself--the rapid response to an emergency situation is easily explained.

Conclusion: Appropriateness of Response

A pertinent theory concerning the adaptive nature of response processes in general postulates that an "appropriate" response process maintains flexibility by relating response processes to certain dimensions of the hazard which elicits it, particularly magnitude and duration.(6) The concept of "appropriateness" here relates to the adaptive goal of survival: inappropriateness" here relates to the adaptive goal of survival: inappropriate responses (such as overcommittment of resources) diminish the adapting unit's potential to survive future "perturbations" as a consequence of decreased flexibility. The best strategy in the "existential game" of survival is to sustain a variety of response devices of ascending cost, to use each in sequence only if the previous one fails, so as to commit the minimum necessary to deal with the problem at hand (see Morren: 1983 for a presentation of concepts, and review of theoretical bases and applications to cases). According to this model, then, a short-term, minor disturbance should elicit a short-term, minor response, engaging in sequence only those devices needed to alleviate the problem.

It is difficult in the case just described to evaluate the "costs" of the responses undertaken by the various actors. They do not constitute a single unit whose "costs" are commensurable, nor are they, together, analogous to an organism whose "goal" is to survive. The algae crisis was a disturbance that affected different actors in different ways--farmers, water managers, experts and government authorities. If the crisis was a different problem to each group of actors, and the costs of responding were not reducible to a common denominator, it would make little sense, even were it feasible, to calculate the costs to each separately and total them up in combination for an overall estimation of cost.

If we were instead to posit a "system" as the responding unit, we might go on to consider the levels of organization at which responses took place--local, regional, national--and, by analogy, posit also that ascending levels of responding unit represent ascending levels of cost in commitment.(7) Information about the existence of a crisis traveled from local to regional to national levels; responses could occur only when the information had reached any

particular level. The flow of information, then, would presumably structure the response process.

But the responses occurred with such speed that they overlapped one another; they were, for all practical purposes, virtually simultaneous. We will never know whether local or regional level responses would have been sufficient to resolve the crisis. Let us say, however, for the sake of argument, that they might well have been. In that case, according to the economics of the evolutionary existential game, the response process was inappropriate. It invested more than was required for the sake of alleviating the hazard, because its timing was "wrong;" less costly responses might well have served the purpose.

However, neither the algae nor the behavior which directly caused it to be a problem, are the sole considerations of the responding actors. "Overreacting" to a problem at hand by investing more than it requires for its own alleviation, may well enhance the "survival" of various actors by providing them with a totally new set of options even while older ones disappear. The responses in this case are only a part of a larger process of cumulative change, and can only be evaluated in the context of that larger process.

Reduction of the immediate hazard posed to crops by algae in the irrigation pipes in fact constituted the removal of an obstacle to the use of the new water resource. While the immediate objective of farmers was simply to produce a profitable yield, neither they nor the other, non-local actors, had the goal of restoring human-environmental relationships to a prior state--as might be the "objective" of response to perturbation on the part of other organisms. The option of restoring such relationships was intentionally eliminated with the initial preparation of the Valley for settlement and cultivation. At that time, the current farmers' predecessors made a commitment to permanent change. What they found was a malarial swamp which, at great expense, they drained and re-contoured. In the process of destroying an earlier human-environment relationship, they created new options. Further change--settlement, improved technology, establishment of cooperating institutions--led to further commitments, closing some doors while opening others. Newly created opportunities to produce and

market crops were the basis for general improvement in the conditions of human life which enhanced their ability to withstand and cope with hazards.

"Over-reacting" to environmental problems or obstacles constitutes the basis for development here. The objective is not restoration of stability, but progressive enhancement of the value of the environment for human welfare. While it is true, as Morren argues, that hazards proceed directly and principally from human actions, so do remedies and other improvements to the human condition. Consequently, we can conclude that such over-reactions themselves have been "adaptive." They have not only eliminated hazards, but in the process of eliminating some and creating others, they have also enhanced the survival potential of human beings.

This conclusion is not paradoxical if we understand that hazards do not exist in isolation. Any one human actor is, at any one time, coping with numbers of different sorts of hazards, and may do so successfully with some, unsuccessfully with others, and may not even be aware of the existence of still others which impinge upon his/her actions. These individuals are interacting with others who are also coping with their own sets of hazards. The interactions between them, and relationships between their various sets of hazards and efforts to deal with them, impose constraints and provide opportunities for each. This is the context in which any particular response must be understood and evaluated.

Even more importantly, the objectives of the actors must be taken into account as a critical component to context. The actors in this case are certainly not simply trying to survive, to exist. Among their various objectives, they are trying to make a good living, to do their jobs as they understand them, to fulfill social responsibilities, and carry out certain ideological imperatives. This case has one distinctive peculiarity: the very existence of the farmers where they are, the fact that they are farmers, the types of interactions they have with managerial authorities, are the product in large part of a deliberate plan with explicit goals. The farmers are not only farming in order to survive, or even just to make a good living. They are also farming because it was the intention of the founders of the state to alter the rural landscape, to disperse the population

throughout the country, to defend the borders, and very importantly, to establish a kind of citizenry which engaged itself in primary production from the land through its own labor. Most of the farmers or their parents were placed in their communities in order to carry out these objectives. The farmers have, for their own various reasons, consented to adhere, in their own ways, to these objectives--objectives of which they are at least aware, even if they did not all participate in their initial creation.

The manner in which the various actors in the algae crisis perceived the problem and dealt with it was shaped by these apparently more remote objectives. The prompt support given to farmers reflects the priority of farming in national objectives; the direct, "hands on" involvement of experts reflects ideological values which are a part and product of explicit, intentional social policy and design.

The appropriateness of the response (or responses) to the algae crisis must be gauged in the context of the wider objectives of the actors. Given what they are trying to achieve, and given the devices and constraints they have at hand thanks to their past history of interactions, how appropriate were the responses? The initial reactions of some farmers, panic, could be deemed inappropriate--it alleviated nothing, and led some to damage their irrigation equipment yet further. As for others, there might be some disagreement about appropriateness, according to the perceptions of each of the cause and nature of the problem. One could say that they each acted appropriately with respect to their differing interpretations and capacities, solving the problem in more ways than one.

Though solving the problem in more ways than one, more perhaps than necessary, might be construed as an extravagance, even evolutionary economics does not necessarily dictate that it be so. This was not a case of putting out a match with a fire hose, but blowing it out, breaking it in half, and burying it in sand. The multiple solutions cohere, and provide extra insurance against a variety of hazards. Given the social, economic, and military precariousness of farming in this situation, extra insurance is not necessarily an extravagance.

The events I have described have a unique context. The population is unusually secure, strong, and healthy, by comparison with vast numbers of farmers in developing countries, despite what I have said about the precariousness of farming here. For purposes of comparison, it is perhaps most useful to look at other cases of planned rural development, particularly colonization by new settlements. But elements of this case are also applicable in a more general sense, to understanding responses to hazards in farming. Specifically, I have looked at who did what, and why, during a crisis. I placed their actions in the context of their objectives and previous actions, those which produced the crisis and those which ameliorated it. The boundaries I have drawn about this case are arbitrary--the context could have deeper or wider, had I chosen. This perspective may be helpful when we try to ask why hazards have devastating results in some cases, and not in others; why in some cases hazards are acted on quickly, or by a multiplicity of means, and in some cases slowly, by one means at a time.

I have treated this case as an instance of a problem of management of the commons. It illustrates what can happen when changes take place in the social and technical contexts of the use of a "public" resource under an established set of regulations. Unanticipated hazards arise, management practices shift; new hazards arise, and management shifts again. How long any one shift or its outcome may last, may depend on yet other circumstances than those which provided the immediate impetus for change. Some of these depend on the ways that hazards and crises present opportunities to actors to achieve goals. The algae crisis presented an opportunity for researchers to collaborate on a project important to their professions; for manufacturers to sell a certain type of filter now certified by the work of the researchers; for regulatory authorities to enforce strict rotation of water-use. Their combined opportunistic responses resulted in removal of unexpected obstacles to farmers to the use of a new resource. The experience of the crisis had further ramifications for the actions and interactions of these groups. But when they came into play, months later, circumstances changed again, thanks to a new hazard, a drought. And that is another story.

NOTES

1. The literature on hazards often uses the term "hazard" interchangeably with the term "disaster," or treats the two as if they were synonymous. However, there is a difference. A hazard is a threat, a source of danger, while a disaster is a major misfortune. A threat can exist without actually causing misfortune, though if perceived, it may invoke a defensive response. If you threaten to hit me, that's a hazard. If you blacken my eye, it's no longer a threat, it's a "disaster." If I run away when you threaten me, I am responding to a hazard. If I hit you back when you blacken my eye, I am responding to a "disaster."

   The misfortune implied by the term disaster is relative and subjective. For the purpose of this paper, a major disaster will be understood to be one resulting in more or less permanent damage to resources on which people depend for their livelihood, while a minor disaster is temporary in its effects on livelihood, and recovery is possible.

2. This research is based on fieldwork conducted in Israel form 1983 to the present; it has been supported by grants from the City University of New York Research Foundation. Although many of the events described here were reported in local newspapers, my data are taken from my own field-notes. Other material reported here whose source is not cited is the product of my own research as well. This applies to attributions of attitudes and statements of actors, which are derived from my own interviews with them. Individuals are not named, and are sometimes identified rather vaguely (eg. "government functionary") in order to protect their identity, since many of the statements are controversial, and made to me in confidence, "off the record."

3. Virtually all Jewish farm settlements are cooperatives or collectives. Arab villages constitute some 10% of the total number; of the rest, about a third (260) are collectives and two thirds (400) are cooperatives. A small fraction are variant forms of cooperative.

4. The motives of farmers to seek profits for themselves (or in the case of collective as a whole) are complex. For one thing, the farmer, or farm family, is the unit of consumption; increased profits mean increased consumption. For another, consumer items are now extremely plentiful, both in the sense of being diverse and of being readily acquired with money. When farming was first established, most goods that are now considered necessities were not even available. This includes not just washing machines and televisions, but electricity and indoor plumbing. Third, farmers are exposed daily to the same information about such goods, as are other Israelis: advertising and other messages that stimulate want.

5. In the mid-1960's a system of allocation of water to communities by "quotas" was established. The formula which determined the size of the quota was set through a very complex process of political negotiations. To simplify, the formula took into account the size of the community (number of inhabitants), the number of "active" farmers, the quantity of land, the crops being produced, and the level of water use at the time. Communities, not individuals in it, received allocations; the communities themselves allocate the water among members according to their own policies, and these vary from settlement to settlement. There are numerous inequities resulting from the establishment of the formula and from the way the quotas are used internally by the communities (see Yaron and Fishelson, 1970). One common complaint is that much has changed since the establishment of the quotas--village size, crops, and so forth. Another complaint (by some) is that since quotas were set partially on the basis of "historical" factors, namely prior use levels, some settlements were unjustly penalized. This includes some very conservative water-users whose water-saving practices resulted in their receiving unfavorable allocations. It also includes the least developed communities of the time, the Arab villages which had barely begun to use irrigation. With modernization of their productive techniques and adoption of irrigation systems and irrigated cash crops, their demand has grown considerably. However, the allocation system was never readjusted to take these

changes into account. More on this subject, below. See also Greenwald (1982).

6. This is the position taken by many "systems" theorists. Rappaport (1969), considers an inappropriate sequencing (with reference to dimensions of problem and response) as a form of systems "pathology"; Flannery (1972) applies this idea to explaining the evolution of civilizations; more recently, Rappaport (1979) expands on his earlier idea of "pathology" in systems and the concept of systemic self-regulation.

7. By contrast, I am contending that what I have described is not a self-regulating system, but a subset of interactions contingent upon the actors' ideas, previous experiences, present goals and other interactions. While this is not inconsistent with the concept of system, I would further argue that it is not useful to think of interactions in any particular sequence as "pathological" because this label obscures the diversity of causes leading to actions and the diversity of costs and benefits to the actors. Thus, the intervention by national officials in a minor local crisis might be beneficial but unnecessary to farmers, beneficial and necessary to technical experts, and neither beneficial nor necessary but costly to local officials. The next intervention might re-order the costs and benefits to each group. What is welfare-enhancing for one group at one time, may not be for another group.

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IN THE RUSTLE
AND POPULARITY

Prologue

Not even this would
The Meghna
Taken away
Put at disarray
Now it is the turn
of this will remain
Not a shred of evidence will remain

The distant river was like a stream of
affection
Barely noticed yet reassuring
But now look,
Boats laden with merchandise for distant
ports
Are pulled along by the aerials
Going right through the front

I have no past, nor any present
Nor do I know where the uncertain future
will take me.
Only this much is certain
After
That is
No
No

Original
Translated by Ali Anwar

185

INTRODUCTION

In recent years, human adjustment systems to natural hazard and disaster have become an abiding interest of anthropologists (Hansen and Oliver-Smith 1982), sociologists (Mileti, Drabek and Haas 1975, Drabek and Boggs 1968) and geographers (White 1974, Burton, White and Kates 1979). In particular, geographers have traditionally given much attention to natural hazards phenomena in terms of understanding perception, response and adjustment processes of hazard victims. To date, the large body of literature on geography of natural hazard typically has focused on individual's perception and responses--attitudes, motivations, beliefs, values and personality--to understand the process of decision-making and the range of adjustment choices (White 1974, Burton and Kates 1964, White and Haas 1975, Kates 1962). While it is often difficult to define and measure satisfactorily behavioral variables such as motivations, attitudes and values, exclusive attention to individual responses and strategies tends to ignore other possible cultural and social factors underlying adjustment to natural hazards. Therefore, in my view, such a behavioral approach is inadequate. Attempts to improve our understanding of human responses to natural hazards are more likely to come if we examine individual responses in broader socio-political and historical context. In other words, behavioral or decision-making models must take into account historical-structural features of the society in the analysis of human responses to natural hazards. This seems to be useful whether the analysis is focused on the individual, the family, or community, or on such issues as access to and control of resources necessary for adjustment and relocation.

In this paper, I want to develop further our understanding of human responses and adjustment to natural hazards by examining aspects of social and cultural life of people dislocated by riverbank erosion hazards in the Brahmaputra-Jamuna floodplain of Bangladesh. More particularly, I shall focus on how kinship, corporate groups, village factions and patronage systems influence adjustment and resettlement options of the riverbank erosion displacees. The paper is divided into four sections. The first section presents the nature and extent of riverbank erosion hazards in the Brahmaputra-Jamuna floodplain. The second section

focuses on displacement, responses and measures of adjustment at both individual and family levels. The third is devoted to an examination of the role of friends/relatives and local corporate groups in adjustment processes. The fourth section is a brief overview of village factions and patronage systems in larger socio-economic and political context in order to illustrate the local dynamics of resettlement of the displaced population.

RIVERBANK EROSION HAZARD IN THE BRAHMAPUTRA-JAMUNA FLOODPLAIN

Riverbank erosion is an endemic and recurrent natural hazard in Bangladesh. Every year hundreds of thousands of people, about a million according to one estimate (REIS 1983), are displaced due to shifting river courses in Bangladesh. The country virtually lies within the deltas of the three main river systems. The Ganges (locally called Padma), the Brahmaputra (known as the Jamuna after its confluence in north Bengal with the Tessta) and the Meghna. Historically, the land has been made up largely of river deposition, erosion and re-deposition. The annual flooding of the plains of these rivers is a blessing because it makes the land fertile; but the force of flood waters also regularly causes bank slumping or erosion. According to a study conducted by the Institute of Engineers of Bangladesh, the Brahmaputra river has been shifting westward at the average rate of 0.8 kilometer per year since 1936; the Ganges eroded about 5.5 km of its west bank near Sujanagar in Pabna district between 1956 and 1975 (Holiday 1986). Even gradual migration or shifting of channels of the major rivers in the country may be anywhere between 200 to 5,500 feet annually (Galay 1980).

There are few [illegible] that may have such unstable [illegible]. It is said that the river [illegible] place for two successive years [illegible] the past 150 years (Ahmad 1968). [illegible] typical year, one-tenth of the total [illegible] of land in the country is severely [illegible] subject to some inundation [illegible] annually experience major [illegible] Curey (1979) identified [illegible] of the

country as affected and/or liable to bank erosion. According to a report, in 1984-85 alone, 283 localities were hit by erosion, of which 38 were in the Brahmaputra-Jumuna floodplain area; the Ganges caused erosion at 30 places; the Meghna at 6 places; the Teesta at 8, and other minor rivers in 201 places (Holiday 1986). Thus, people lose their homes and their agricultural lands every year to this hazard phenomenon; many rural markets and towns are also severely affected by erosion annually.

At the same time, channel migration also creates extensive mid-stream sandbanks, forming small islands (locally called chars) which are settled by people of either or both banks and which remain sources of perennial dispute between conflicting claimants. This erosion and accretion of land is a characteristic feature of the courses of the active river systems of Bangladesh. Depending on the quality of the top soil, the char lands can be used immediately after they reemerge. For example, land with silty soil is the most valued; one can grow transplanted rice and other crops practically with no tillage. Land with clay and mud is not easily cultivable and is generally used as pasture during winter. The sandy chars are infertile, but the poor peasants nevertheless try to raise millet or cultivate sweet potatoes (Rashid 1977). For the first few years, people use the new chars for cultivation only during the winter seasons until they build up more deposition above the normal flood level or are wiped out again due to changes in the river courses.

Shifting river channels in Bangladesh thus not only cause loss of land and human settlement; they also open up frontiers of settlement in the new depositional land. In a country with over 100 million people with 90% dependent on agriculture and living in rural densities of nearly 1,800 per square mile, 50% already landless, and many more continually displaced by bank erosion, one can well imagine the demand for even these apparent unstable land resources for making a living. For most people in the floodplain of Bangladesh, access to new depositional land, its use, exploitation and control are crucial factors as a specific form of adjustment to riverine environment and erosion hazards.

The research for this study was carried out in Kazipur Upazila in the Brahmaputra-Jamuna floodplain of Bangladesh.(2) Kazipur is considered one of the worst hit erosion

areas of the country. According to the local upazila officer, bank erosion and population displacement is the "Number One" development problem of the region. The upazila covers an area of 143 square miles and has a total population of 212,810 with a density of 1,488 per square mile (BBS 1983). The original headquarters of this administrative unit and the principal market town, located on the right bank of the extreme west channel of the Jamuna, along with eight other villages, were literally washed away by severe erosion in 1978. Only one-third of the Kazipur upazila is now in the mainland; the remaining two-thirds lies across the west channel within the river in char village settlement (see Figure 1).

The char villages are accessible by boat--the only mode of transport and communication year-round. There are no rural roads for inter-village contacts or any other infrastructural facilities. The situation becomes even worse during the monsoon period when the breadth of the river widens to between three and ten miles at certain points, flooding the entire char areas. The annual flooding is again associated with widespread bank erosion.

As a flood control and protection measure in the Brahmaputra floodplain, an embankment was built in 1962 by the Water Development Board (WDB). The embankment stretches 152 miles north-south from Rangpur to Serajganj via Kazipur along the right or west banks of the Teesta and Brahmaputra rivers (see Figure 1). Since the completion of the embankment in 1967, there have been a number of breaches, resulting in severe floods in areas inside the embankment. The most devastating flood in the recent history of Kazipur-Serajganj occurred in 1984 while this research was being carried out. Most of the area of the entire district of Serajganj was inundated, resulting in tremendous loss of property and crops officially estimated at Taka 500 million (US$20 million). According to District Administration sources (Hossain 1985), 127 people died, about 30,000 families were displaced, of which 7,000 were permanently dislocated due to the 1984 massive flooding and erosion. A report published in a national daily (Ittefaq, August 19, 1984) claimed that 14,000 families had lost their homes during the flood and erosion and took shelter on the embankment between Kazipur and Serajganj. The majority of these displaced families are from char villages who are

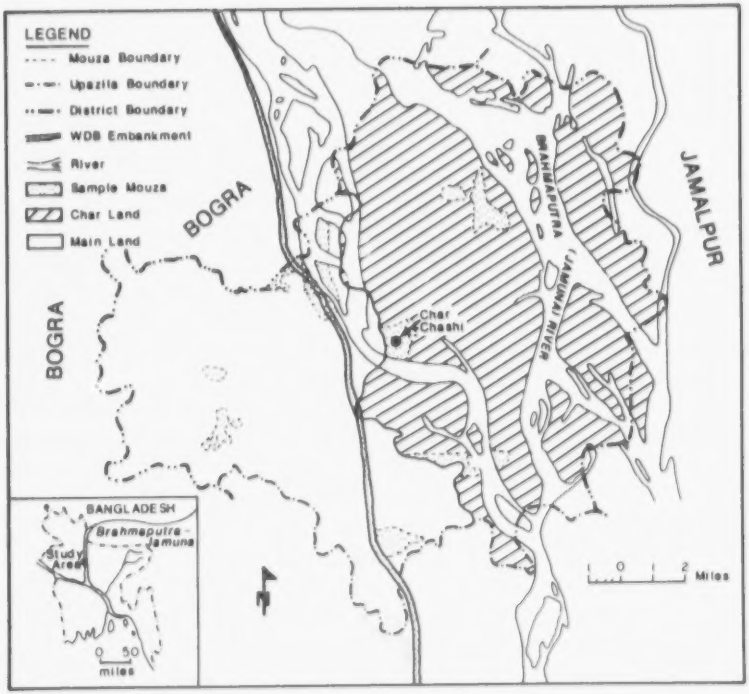

Figure 1

The Study Area

likely to remain almost permanently on the embankment as squatters for lack of any other alternatives (Zaman 1984).

DISPLACEMENT, RESPONSES AND MEASURES OF ADJUSTMENTS

The extent of displacement among the floodplain inhabitants is remarkably high, with multiple displacements reported by about 80% of the displaced households. According to the field survey carried out in 1984-85, 394 (64%) of the 619 sample households from eight mouza (land revenue unit) villages reported having been displaced by erosion at least once. Table 1 provides us with some staggering statistics about the displacement phenomenon itself.

TABLE 1

DISPLACEMENT FREQUENCY OF DISPLACED HOUSEHOLDS IN KAZIPUR

Frequency of Displacement	Frequency of Households	%
1 to 3 times	158	40.10
4 to 6 times	99	25.13
7 to 9 times	60	15.23
10 times and over	77	19.54
TOTAL	394	100.00

Forty percent of all the displaced households experienced displacement between 1 to 3 times; 25% between 4 to 6 times; 15% between 7 to 9 times; and nearly 20% of the households were displaced 10 times or more. Even such statistical figures are unable to depict the capricious socio-economic conditions of the displacees in the floodplain. As one displacee put it: "We have to keep rolling like silt". He further said: "For us, it is normal; we expect it to happen, and happen any time. You see, I have been displaced twelve times in the past twenty years... God knows how many more times I have to move before I die!"

One possible reason for this high frequency of displacement is the fact that people tend to move very short distances after displacement. Table 2 presents data on the nature of migration by the displacees from their last place of displacement.

TABLE 2

DISTANCE MOVED BY THE DISPLACEES FROM THEIR LAST PLACE OF DISLOCATION

Distance in Mile	Frequency of the Displaced Households	%
Less than 1/4 mile	66	16.75
1/4 mile to 1/2 mile	107	27.16
1/2 mile to 1 mile	87	22.08
1 mile to 2 miles	86	21.83
Over 2 miles	48	12.18
TOTAL	394	100.00

The survey data contradict the traditional literature on rural-urban migration in Bangladesh which suggests that the large majority of people affected by natural hazards (e.g., floods, riverbank erosion, coastal cyclones) tend to migrate to cities (Islam 1976, Qadir 1976). On the contrary, the general pattern borne out by the data is that nearly 88% of the displacees remained within two miles of their previous place of displacement. This means that the displacees have a general tendency to remain close to the river despite further possibilities of displacement in the immediate future. To understand this apparent "irrational" behavior we shall look into the social and cultural dynamics of adjustment to riverbank erosion in the next section.

The floodplain inhabitants typically view both flood and erosion as "Allahar Gajab" (disaster) an act of punishment by God who is thought to be displeased with His people for their indulgence in bidharmi (anti-religious) activities (Paul 1984). Thus, reports of religious meetings, mass prayers and

dropping tabiz (talisman) into rivers to check bank erosion are not uncommon in erosion hazard areas in Bangladesh (Islam 1987). Such religious attitudes to erosion hazards coincide with relatively limited physical adjustment strategies to check bank erosion. About 50% of the displacees reported that they simply abandoned their lands without taking active measures to protect them from erosion. However, when threatened by erosion, people take a number of measures to reduce their potential loss in the erosion process. For example, they dismantle their houses (primarily thatched roof and wall, or corrugated tin roofs) and take them along to their new destination (Zaman 1986). Other people do attempt to protect their land, particularly homesteads, by building chegar, fences made of bamboo to check erosions. They may also sell livestock, valuable personal belongings (e.g., ornaments), and remaining agricultural and/or homestead land when they abandon riverbank lands. Those who migrate out of the area for a distant location try to sell even their land records for whatever price they can get from local large landowners who pay very little cash for such land records. Apart from these measures, physical moves to either the WDB embankment for shelter or to other non-affected char areas constitute a significant adjustment strategy. But the sudden displacement of people from their land, together with physical limitations of embankment squatting has separated many people from their traditional organizations of mutual reliance, leaving them particularly vulnerable on the embankment.

ROLE OF FRIENDS, RELATIVES AND CORPORATE GROUPS IN ADJUSTMENTS

According to the survey data, the displacees in Kazipur villages received little assistance or support from the local Upazila administration or any other government agencies in coping with erosion hazards and displacement. Only 89 (23%) of 394 displaced households received some assistance from various sources. Therefore, the majority of affected people had to develop their own adjustment strategies.

TABLE 3

SOURCES OF ASSISTANCE RECEIVED BY THE DISPLACEES DURING THE LAST DISPLACEMENT*

Sources of Assistance	Frequency of Assistance	%
Relatives	67	51.93
Friends	34	26.36
Other villagers	18	13.96
Community leaders	4	3.10
Upazila office	2	1.55
National government	2	1.55
Relief agencies	2	1.55
TOTAL	129	100.00

*Multiple Responses Possible

Less than five percent of all assistance received is from government sources (upazila, national government, and relief agencies), typically either in the form of relief goods or wheat under the Vulnerable Groups Feeding (VGF) program. As indicated in Table 3, the principal sources of assistance are relatives (52%) and friends (26%). The assistance received from relatives and friends consists of moral support and advice on destination (32%); free labor at the time of move (50%); and cash loans and food (18%). Thus, friends and relatives provide both moral and material support to cope with dislocation and adjustment.

It is particularly important to realize that adjustment to displacement in the floodplain of Bangladesh has been conditioned historically more by social, cultural and political factors than by individual choices (Zaman 1987a). For this reason displacees generally move short distances even after experiencing multiple displacements. The adjustment choice

is eventually the product of a complex set of factors including: (i) availability of land for resettlement, (ii) support from friends and bangsha people (patrilineage), (iii) possibility of maintaining closer ties with the samaj (local corporate group), and (iv) whether or not they have committed themselves to such patronage as sharecropping or free use of land for homesteads from relatives and/or locally powerful village leaders who head samaj organizations.

Table 4 shows that the single most important factor for choosing the present destination after previous displacement is the presence of patrilineal relatives (22%). Therefore, kinship remains an important factor in the migration decision. "How can you live without your kinsmen? You need them always," said one settler. Existence of owned land (15%), Khas (unused government land) or rented land (10%), and free use of land provided by relatives (6%) were some of the important factors for moving to their present place of residence by the displacees. Support provided by friends and relatives (9%) was also a factor in the migration decision and adjustment.

About six percent of all respondents considered it important to remain within and/or to maintain closer ties with their traditional samaj organization prior to moving to the present place of residence. The samaj, an informal but important local social grouping based on kinship, social and religious interests of its members, is well recognized in Bangladesh rural studies (Bertocci 1980, Zaman 1982). As a local political and religious community, the samaj is the primary arena within which members interact most extensively and are mutually involved in networks of social and ceremonial links and interdependence. Therefore, any detachment, or separation from samaj puts the victim in a relatively difficult situation due to both loss of membership and support of the group. Out of the total 394 displaced households, 141 (36%) reported separation from their respective samaj due to dislocation. To the extent possible under this hazard situation, the general tendency found the displacees in Kazipur villages is to cluster together with their kin and samaj groups in their new place of residence.

TABLE 4

FACTORS RESPONSIBLE FOR MOVING TO THE CURRENT PLACE OF RESIDENCE BY THE DISPLACEES*

Reason	Frequency of Responses	%
Had own land	88	15.30
Availability of khas rented land	60	10.44
Free use of land provided by relatives	35	6.09
Returned to depositional land	45	7.83
Hoped land would reemerge	29	5.04
Presence of bangsha people	125	21.74
Support of relatives/ friends	51	8.87
Closer ties with samaj	34	5.91
Had no money to move elsewhere	30	5.22
Had no time for alternative	49	8.52
Others	29	5.04
TOTAL	575	100.00

*Multiple Responses Possible

VILLAGE FACTIONS AND PATRONAGE SYSTEMS IN ADJUSTMENT

The discussion in previous sections point to the fact that the displacees are particularly dependent upon their kin and local corporate groups for assistance and support in adjusting to riverbank erosion hazards in Bangladesh in the absence of institutional public assistance. In this section, I argue broadly that individual responses or adjustment patterns are in fact rooted in a wider network of social, economic and political relationships such as village factions and patronage systems which may facilitate or even impede adjustment and relocation of the displaced population (Zaman 1987a).

Displaced households having no land of their own to resettle, or cannot expect any material assistance from their equally poor relatives, have very limited choices. They can move to the WDB embankment and join the ever growing squatter settlements. But the WDB does not encourage settlement of displaced population on the embankment. The construction of houses on the embankment makes it structurally weak, thus creating problems of seepage and formation of numerous rat holes that result in periodic breaches. In the past ten years since the squatting settlements have developed, several attempts have been made by the WDB to evict the displacees from the embankment (Rahman 1984, Zaman and Bablu 1985). During the initial few days of our fieldwork, some occupants mistook us for WDB officials, listing their names to evict them. An older woman said: "Throw us into the Jamuna. We have no place to go." Another old man in his sixties, appeared to be perplexed while talking to us, he said: "Where shall we go? The Jamuna has doomed us all."

In 1982, the WDB wanted to evict these illegal occupants under Martial Law Regulation #15, but later abandoned the program on "humanitarian grounds". Serajganj WDB officials consider that proper maintenance of the embankment requires eviction of the squatting population. The embankment therefore cannot be permanently used by the displacees.

Displaced households can also migrate to cities, but the survey data presented earlier indicate that the extent of out migration from Kazipur is very limited. Finally, they can remain in the chars as "patron-tied" dependents of the village faction leaders and locally powerful talukdars (landlords)(3) who provide land and other necessary support to resettle, because they need the landless destitutes to work on their land. The displacees are also useful to the village leaders and local talukdars for one other important reason: adult male members of these households are readily available as lathiyals (armed retainers)(4) to organize violent fights when necessary to gain control over emergent char lands. According to the survey data, over 50% of all households in char villages are such displaced and landless "dependents."

An in-depth anthropological study was carried out in Char Chashi (see FIGURE 1) to understand the nature, basis and mechanism of such patronage relationships in the village with respect to resettlement. The total number of households in the village was 205 in 1985. In all, the villagers identified eight different factions (dals) with which they are aligned either by kinship or economic relationships. The faction leaders, locally known as mattabars, are typically large land owners in the village. Other than kinship, the basis of recruitment to factions in the village is primarily economic, such as (i) provision for free use of land for homesteads by the displaced families, (ii) employment as agricultural wage laborers, and (iii) sharecropping. A particular displaced household may be tied to a faction leader by one or all of these economic relationships. In return, the "dependents" are expected to support the faction leader in village-level political struggles and join organized conflicts as lathiyals for control over new depositional land.

The network of relationships of the village faction leaders extend to many different neighboring villages through a system of alliance or opposition with one or another prominent talukdar in the area. In Char Chashi, village leaders are linked with locally powerful talukdars and often work as their political "agents" to organize land conflicts which are endemic in the riparian villages of Bangladesh.

People of Char Chashi told us repeatedly that in char life violence is the name of the game, and the ultimate arbitrator of all disputes over the land. The local talukdars are so powerful that the poor and their dependents would not dare to disoblige them. The talukdar, one informant said, "can make a day night and can pick up any one from the char at his will, and he may not return to the char for the rest of his life." Sometimes local law enforcing agencies also fail to make their law operative if it affects the interest of the talukdars. People view the brutalities in the process of land grabbing as natural as the natural process of land erosion (Wahed, Kamal and Hasnat 1983).

Traditionally, ownership and disputes over alluvion and diluvion land were regulated by local customs and titles where previous owners had access to new depositional land. The first legislative enactment for regulation of disputes was the Bengal Alluvion and Diluvion Act of 1825 (Gupta 1940, Kabir 1961). In the course of almost 150 years since then, a number of changes have taken place. However, the most drastic changes in ownership rights of accretion land were made by the Presidential Order of 1972 (Numbers 72, 135, and 137) which provided that all newly emergent land previously lost by diluvion shall now be considered khas land and shall remain under the absolute control of the government. The objectives of the Presidential Order of 1972 were to recover all such land from the control of the local talukdars, and to redistribute it among the displaced and landless peasants for cooperative or collective farming and resettlement (Ali 1980). Despite this current legislation that new accretion land is for redistribution and resettlement of the displaced population, very few people have actually gained their due share of land in the nearly emerged chars. On the contrary, the use of violence, dispossession, murder, rape and confiscation of crops and animals have become almost established practices of char life in Bangladesh (Wahed, Kamal and Hasnat 1983, Zaman and Wiest 1985, Zaman 1987b). The selective use of violence by local talukdars and their dependent lathiyals work as the ultimate arbitrator of all disputes over new char land. When a talukdar succeeds in a violent fight, resettlement takes place usually with his own support groups and/or kin and dependents, and the talukdar remains the virtual owner of the entire char. Therefore, the processes relating to village factions and patronage systems are thus

systematic socio-political responses to the whole phenomenon of erosion and displacement.

CONCLUSIONS

Population displacement due to riverbank erosion is a recurrent problem in Bangladesh. The foregoing discussion indicates that human adjustment strategies to displacement in the Brahmaputra-Jamuna floodplain are influenced largely by social, cultural and structural factors. In the absence of any institutional public assistance program the displacees remain generally dependent upon their relatives, friends and local corporate groups for assistance in adjusting to displacement and eventual resettlement. Thus, the evidence provided in this paper suggests that behavioral models with emphasis on individual perception and choices are insufficient to understand adjustment to riverbank erosion hazard. Historical and social structural factors also shape individual decision-making and choices. These findings are significant in reformulating theoretical understanding of responses to natural hazards. Therefore, future studies in natural hazard research should focus more on the social, cultural and structural dynamics of adjustment as much as on issues of individual perceptions and choice making behavior to understand the problem holistically.

NOTES

1. An earlier draft of the paper was presented at the 21st Bengal Studies Conference held at the University of Wisconsin-Oshkosh, USA, May 8-10, 1987. This revised version has benefited from criticisms by Professors Peter Bertocci, Paul Greenough, Ralph Nicholas, Anthony Oliver-Smith and Louise E. Sweet. Professor Raymond E. Wiest read several drafts of the paper, critique it and also made some editorial suggestions. I am thankful to all of them. However, any deficiencies that may remain are mine only.

2. The research reported here forms part of a larger data base of the REIS (Riverbank Erosion Impact Study) Project, a multi-displinary collaborative research between University of Manitoba (Canada) and Jahangirnager University (Bangladesh) funded by IDRC (International Development Research Centre), Ottawa, Canada. I happily express my appreciation for support to John Rogge, the Project Director, to my co-researcher Chowdhury Haque and my research assistant Anwar Islam Bablu. Fieldwork in Kazipur was carried out for a period of 15 months from June 1984 to August 1985. Using a complex multi-state probability sample method (Haque et al. 1958), a total of 619 household units were chosen from eight different mouza villages. An anthropological study was carried out by the present author in Char Chashi (pseudonym), one of the sample villages, to achieve an in-depth understanding of the nature of adjustment and dynamics of resettlement locally.

3. Talukdar is a generic name used to refer to a class of rural landlords associated with the now defunct zamindary (landlordism) system of Bengal. Despite the abolition of the system in 1950 (East Bengal State Acquisition and Tenancy Act), the land-based power and authority of the ex-landlords remains very much alive even today. For further useful reference on the evolution of zamindary system, see Ray (1977).

4. The word "lathiyal" comes from lathi, i.e., the bamboo stave which is the classic peasant (and police) weapon in Bangladesh. Lathiyals is used here as a plural of Lathiyal. The lathiyals have been historically a kind of "private force" of zamindars and talukdars in Bengal. In contemporary usage, the lathiyal is an "armed retainer" of the talukdar and his faction responsible for organizing violent confrontations for gaining control of depositional land. The power and authority of a local talukdar is reflected in the number of lathiyals that he maintains or can mobilize during a confrontation.

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DROUGHT AND DESERTIFICATION AS CONSTRAINTS ON THE AGRICULTURAL DEVELOPMENT OF THE WESTERN SUDAN

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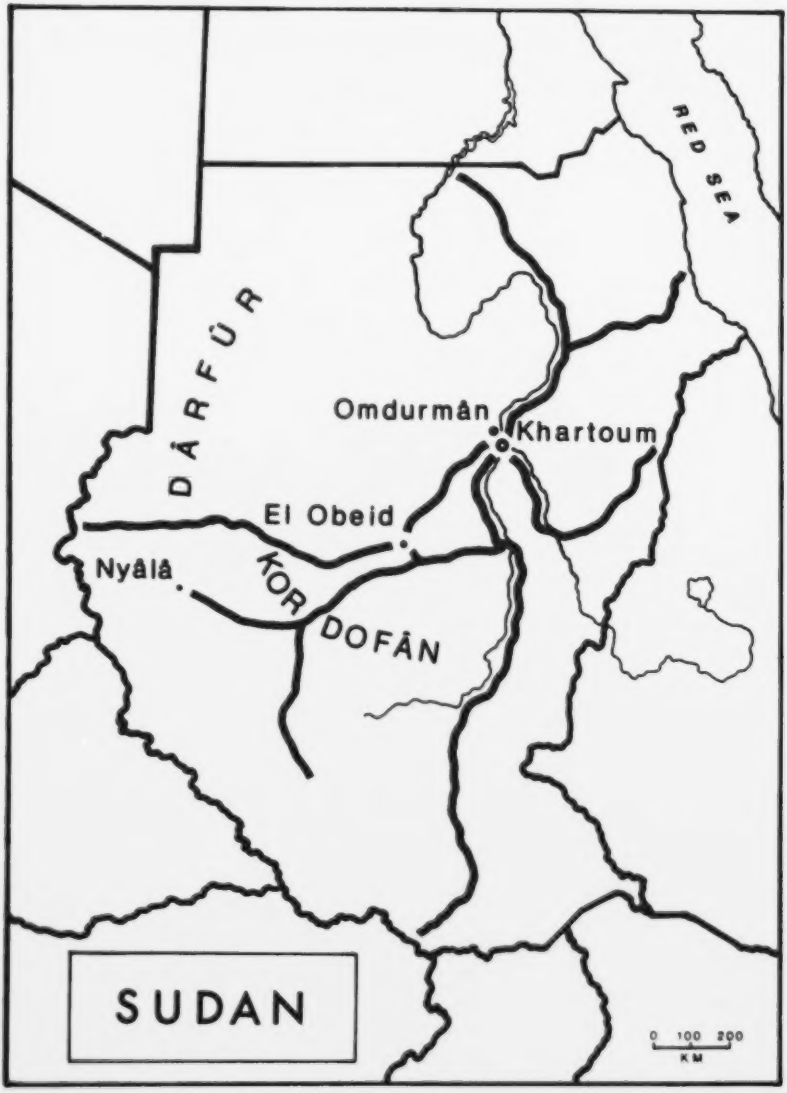
Drylands liable to desertification cover approximately 4.5 billion ha., or 35% of the earth's land surface. In these precarious environments resides a population in excess of 850 million persons, which is approaching 20% of the world's total (Mabutt 1984:103). Households reliant on rainfed farming comprise 60%-70% of the residents of dry, marginal areas of Sub-Saharan Africa, the Indian subcontinent, China, South America, and Southeast Asia. Repeatedly over the past two decades damaging droughts have taken hold of nations placed within these regions. The years 1984-1985 alone saw 20 African countries suffer serious food shortages occasioned by drought (UNOEOA 1986).

Scientists' forecasts agree broadly about a trend for this decade and the next, and likely to push into the 21st century. Droughts will probably turn into famines more often. Relevant indicators give this prediction plausibility. While high population growth rates continue, gaps between traditional and modern land-use methods will hold through, and overexploitation will reduce natural resource productivity, thus exacerbating rural hunger. Peasant poverty and drought alone will limit severely the progress governments

Map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can achieve toward subsidizing economic reconstruction in drought-prone areas.

Drought-prone regions may include irrigated and rainfed sectors. Irrigation does not automatically immunize rural households from drought stress. Drought repeated often lowers river levels, even to the point of depriving command areas of scheduled allotments of water. Dust blown in from hinterland tracts denuded by droughts constricts river channel containment, thereby elevating hazards of flooding and bank erosion. And bent on escaping hunger at home, the migrant work force in or near irrigated projects may overtax the resources making these refuge areas liveable.

All such considerations notwithstanding, the most formidable risks of famine occurrence reside in rainfed and not irrigated territories. Demographics alone argue this point: generally the rainfed sector supports more people. It also creates in relative and frequently absolute terms much smaller concentrations of wealth, or conversely, broader and deeper pockets of poverty. Mechanized agriculture makes fewer inroads in rainfed areas, where commercial farm projects dependent on machines often fail. Further, irrigated lands attract better physical and administrative infrastructures. Finally, a point worth considering has to do with how often land productivity improves under irrigation but declines in rainfed areas which are drilled for water: overall, rainfed regions suffer more land degradation.(1) Drought often associated with desertification presents a substantially greater threat to subsistence in the non-irrigated sector.

Few rainfed drought-prone communities possess the means of keeping droughts from causing famines, nor are they quick to rebound from the ravages of drought. Both tasks require government assistance. More often than not the countries with sizeable populations at risk are equipped poorly for either task. They depend on partnerships with foreign donors for establishing development projects which <u>at minimum</u> assure enduring food security.

Hence drought vulnerable people find themselves facing a future hinged increasingly on development project success at serving the rainfed sector. Published studies would

presumably document in some detail the safeguards development schemes afford their clients and themselves from famine stresses induced by drought. But studies of this type are rare.

This paper is arranged in three parts. Part one describes the gravity of drought and desertification problems in the western Sudan. Annually, much of this vast region receives less than 500 mm of rainfall, making agriculture precarious under rainfed conditions. Droughts are commonplace and accelerate land degradation caused chiefly by the widespread encroachment of shifting cultivation on enormous stretches of semi-arid rangeland. Part two discusses measures being taken by international agencies working in cooperation with the Government of Sudan for achieving sustainable rainfed agriculture under these adverse conditions. Constraints rainfed agriculture must contend with just from drought are taken up next. With the western Sudan as a prime example, the paper points up the need for factoring climate variability into rainfed project design.

DROUGHT, DESERTIFICATION, AND WESTERN SUDAN AGRICULTURE

Drought and Agriculture

The western Sudan, comprising for purposes of this paper the regions of Darfur and Kordofan, sits on a low undulating plain elevated 600 meters above sea level.(2) Water courses flow from the Jebel Marra highlands in west central Darfur, the Nuba Mountains in South Kordofan, and from the Bahr el Arab and Bahr el Gazal drainage system, which originates from the Sudan/Central African watershed. Rivers run intermittently and form pools during the dry season. In drought years bore holes and dams (hafires) become the main sources of water for farmers and herders.

Neither surface water nor precipitation are plentiful. Rainfall varies from 100 mm in the northern deserts to 800 mm, far to the south. These are long-term averages, however. Recently, years of rainfall in excess of 200 mm, which nears the 250-300 climatic limit of rainfed agriculture in this region, have been few. Precipitation had fallen well

below 250 mm over much of the area during the 1984 drought. As in other parts of Africa's Sudano-Sahelian belt, with each degree of latitude, south to north, rains begin later and end earlier, rainfall variability increases, and rates of evapotranspiration rise.

Pure pastoralism has all but vanished over the past 50 years. Small enclaves of pure pastoralists are still to be found among the Rezeigat, Hawazma and other cattle herding tribes spanning the southern savannas, and among such camel herding specialists as the Meidob, Kababish, and Mahria of the northern semi-deserts. Surviving nomadic groups constitute but a very small fraction of the total population of the region. Especially owing to droughts and the expansion of boreholes and their appended markets, the trend away from tribal economic specialization has accelerated since the 1960s. The modal food production unit is a small farm, 7 to 8 persons large, owning perhaps 10 to 12 hectares (ha.) of land. Family herds may remain at home permanently or alternate between homestead and transhumant camps. Households diversify their adaptive strategies by participating in assorted off-farm enterprises. For example, employment opportunities on mechanized farm schemes and in large towns and cities draws many males from their villages during the dry season.

Fields are planted in millet and/or sorghum, and cereal crops for the most part stay out of market trade except in bumper years. More land goes into millet than into sorghum because millet exhibits superior adaptability to goz (sandy) soil characteristics. For the majority of farmers without alluvial land to cultivate, crop income comes from sesame, groundnut and gum arabic sales. Farmers work their land, unfertilized usually, using hoes, except on mechanized sorghum schemes in South Kordofan. Where land is scarce, farmers lay it in fallow for less than twice the period they cultivate it, or abandon sound practice and crop their fields continuously. In general productivity is low. Millet yields average about 200 kg/ha/year in more arid northern latitudes, climbing to 450-500 kg/ha/yr during years of "average" precipitation, toward the southern territories. Sorghum fields turn out yields of 700 kg/ha in good years. During the drought of 1984, the sorghum crop failed almost totally, and millet production on many farms dropped below the 150 kg/ha require for subsistence (Oxfam et al. 1985).

Soils of the region include clay plain soils, gardud soils (hard brown loams), alluvial clays in the valleys, and grey crusty naga'a soils deposited in seasonally flooded depressions. Alluvial soils collect in the basins of streams and river beds (wadis). Cultivation of mangoes, papayas, tomatoes, onions and many other vegetables and fruits produced for cash takes place near the banks flanking these washes. Alluvial land is not abundant however. The rains leave a hard cap or pan on naga'a soil surfaces, which cannot be broken with hand tools. In years of good rainfall, when the recharge of the naga'a soil profile brings the hardened land up to field capacity, naga'a formations can provide much higher crop yields than goz (sandy) soils. In years of poor rainfall, naga'a cultivation fails completely. Sorghum is grown on clayey/loamy soils of the alluvial and basement land systems, and in depressions on more heavily mantled goz tracts.

Desertification

By almost all authoritative accounts, the western Sudan is destined for ecological ruin unless fairly drastic preventive measures take effect soon. The Sudan Government's Desertification Control and Rehabilitation Program (DECARP) prepared a document for the 1977 United Nations Conference on Desertification. DECARP's prognosis of a decade ago is still valid in the view of many (e.g., Ibrahim 1984; Eckholm and Brown 1977; Mangouri 1985). It warns that most of the gum arabic belt, 10 million animal units, and "vast areas" of woodland are at risk. Desert advance was progressing at a rate of 90 to 100 km 17 years prior to the middle 1970s, and at a rate of 5 to 6 km per year at the time of the report (Government of Sudan 1977).

So grave is the situation in North Darfur (between isohyets 200 mm and 700 mm) that moderate to severe desertification menaces more than half of that province's land resources (Ibrahim 1984:187). North Kordofan is no better off: "The vegetation belts are moving southwards and species adapted to desert conditions are invading more productive areas, while "wildlife species that were once abundant have disappeared from the affected areas" (UNSO 1981:20-21). Desert encroachment is imperiling life in the savannahs of South Darfur and South Kordofan, home to

millions of cattle herding nomads (Baggara) and farmers. Two leading officials with the Sudan Range and Pasture Administration saw the threat this way (Suliman and Ali 1983:17):

> Thousands and thousands of areas in the Baggara grazing domain have been denuded due to trampling of livestock during the early wet season. Moreover, most forage plant species have been eradicated because of early grazing before they complete their early life span and deposit some seeds in the soil bank. This misuse will cause completely denuded areas that act as nuclei for potential desertification.

On ecosystem stress in the savannah Hammer believes the data show that (1982:xii):

> in the savannah belt...soil fertility began to decrease thirty to forty years ago and is now much below normal. This belt covers 500,000...km and is the homeland of 60 percent of Sudan's estimated 17 million people.

There is remarkable agreement among public officials and researchers on the pervasiveness of risks and incidents of desertification in the western Sudan.

A few important desertification factors at work in the western Sudan can be discussed briefly. Often, it will be seen, they come into play under the influence of droughts.

Fallow curtailment

A shortening or elimination of fallow intervals is seen as an ominous indicator of land abuse, especially on sand sheet formations. The farmers canvassed in Fuller's (1985:34) South Darfur survey keep no more than 1.6 feddans (3) of land fallow for every feddan under cultivation. In view of the 1:4 cultivation/fallow ratio prescribed by the Western Sudan Development Corporation (WSDC), Fuller anticipates danger stemming from the continuation of rotational cycles incorporated in the farming conventions practiced by his informants. Surveying 354 farmers from

North Darfur, Ibrahim (1984:10) discovered a high proportion (72%) who cultivate continuously without fallowing. Lower alluvial valleys tucked below South Darfur's Jebel Marra range are now predominantly farmed without fallow (HTS 1977:21). Intensively cultivated alluvium occurs in other parts of South Darfur as well (HTS 1976a). INSORMIL researchers based in El Obeid, North Kordofan, cite an FAO recommendation dividing arable tracts into 2/5 Acacia Senegal fallow and 1/5 cultivation. Most farmers INSORMIL surveyed, however, regularly cropped more than half of their fields, "a fact that supports the view that soil fertility in the region is steadily declining due to insufficient fallowing" (Reeves and Frankenberger 1982:ii). This list of examples can be extended easily.

Population pressures

Human and livestock population buildups in and around towns, near wateryards, and on productive tracts of land with well-watered silty or clayey soils despoil the local vegetation cover. Overgrazed ranges and wide perimeters of land ringing towns and permanent water points with sparse patches of brush and grass dot the landscape of this region (e.g., Ibrahim 1984:18-19; Haaland 1982:101; Sammani 1984:14-15). These concentrations of pressures come about as overall rates of population growth stay as high as 3-5%, and as water scarcity during the 8 to 9 month dry seasons and frequent years of drought draw people and livestock to wateryards (4) and shallow wells. Droughts alone have dramatic effects on human spatial arrangements. Failure of the rains of 1983 and 1984 has been a factor in the movement of some 150,000 to 300,000 persons and their herds to South Darfur from neighboring Chad and North Darfur. In the drought year of 1984-1985, almost 2 million persons and their livestock were estimated to have fled from northern to southern regions of the western Sudan (here including southern parts of the White Nile Province) (Khalifa et al. 1985:6). Regional authorities worry that such massive influxes may overtax agropastoral resources of the southern savannah zones.

Destruction of tree stocks

Tree stocks are dwindling in the western Sudan although rates and scales of eradication cannot yet be specified on a regional scale. The research literature abounds with accounts of how households situated in densely settled areas typically spend the better part of the day gathering firewood (Hammer 1982:27; Scott-Villiers 1984:19), travelling far afield for lack of adequate supplies in or near the family farm. As distances to wood for fuel increase, farmers start thinking about taking usable wood from their own fields, especially in areas where unclaimed land is in scarce supply.

No single factor can explain this tendency. Back-to-back droughts take their toll of such valuable tree species as Acacia Senegal and Acacia Mellifera. Felling trees for sale as firewood or charcoal decimates tree stocks near towns and permanent villages, over radii as wide as several kilometers. Commercial tree destruction is not confined to settlement perimeters. Crop failure and livestock mortality during years of drought entice nomads and farmers into firewood trade from distant collection points on open rangeland and in forests (e.g. Ibrahim 1984:110). A number of writers sense nomads to be the main culprits in this respect (c.f. HTS 1977:3). Villagers from the savannah interior complain bitterly, moreover, of northern camel and goat nomads descending into better watered areas and pollarding leafy branches and stripping off bark for their famished herds (Awadalla 1985).

The decline of Acacia Senegal (hashab), which had until recently flourished within a broad rainfall gradient of 280-450 mm, is resoundingly deplored. Being a legume, hashab roots fix nitrogen so it is an important source of soil fertility. Its extensive network of roots allows earth to absorb raindrops and hold soil particles together. Like all standing trees, hashab breaks wind velocity and shelters livestock and wildlife from the scorching midday sun. And where farmers claim trees as personal property, the land around them cannot be cropped, including fallow tracts, without the owner's consent. Acacia Senegal is or was therefore associated with a laudable system of land management.

Acacia Senegal has lost ground for a number of reasons. One of the most important arises from the place gum arabic holds in the village economy: it is tapped entirely for the value it commands as a cash crop. Low international prices for gum over the last 10 or 15 years have taken away incentives peasants would require for going through the laborious operations of collecting it (cf. Holy 1979; HTS 1976a). In addition, the national marketing system discourages farmers from producing gum. The producer prices set by the National Gum Arabic Company are low in comparison to other crops and to the prices at which gum is exported. In North Kordofan, for example, 80% of the export price of groundnuts accrues to the producer, who receives only 40% of the export price earned by gum arabic (UNSO 1981:30).

Sedentarization and livestock marketing

The demise of nomadic pastoralism in recent history has many causes. Droughts play a role by destroying pastoral wealth. Bore holes drilled by the thousands during the government's massive Campaign Against Hunger in the 1960s and early 1970s opened up new agricultural lands and social services attracting pastoral households. Sedentarization programs channeled through mechanized farming schemes have had an effect. So too have rangeland contraction and degradation. And weakened tribal authority structures, once a source of control over stock routes and pasture boundaries, have dismantled the pastoral resource base. Just in the Kababish Rural Council of North Kordofan and in the Zaghawa region of North Darfur, more than half of the almost 300,000 nomads accounted for some 30 years ago have not settled (Ibrahim 1984; El Sammani 1984).

What bearing on sedentarization does desertification have? For one thing, the imbalance grows between predominantly herding and predominantly agricultural livelihood systems of the western Sudan. Pastoralists give up more land and more people to agriculture, which in turn weakens the political clout they need in defense of their economic existence. Hence, more farmers and sedentary livestock invade agronomically fragile rangelands. Of demographic significance is that first, more families will fill the ranks of an expanding agricultural sector and second,

the size of the family unit on average increases. There is some evidence to suggest that, compared to nomadic households, farming families marry at an earlier age, have less stable marriages, and allow more of their adult males the chance to marry. Higher per capita incomes and less strenuous living conditions come into play also, on the part of the farmers. All of this is to say that marriage patterns among farmers are conducive to much higher rates of fertility (Henin 1969).

Pressure on contracting rangelands might be relieved with improved facilities for the commercial offtake of livestock. Two main transportation arteries link production areas of the western Sudan and major consumption centers in the east. Neither the rail lines running along a route west from Nyala through El Obeid and Kosti to Khartoum and Port Sudan or the trekking route originating west of Nyala and passing through Kadugli, El Abbassiya and finally to Khartoum, however, move sizeable numbers of livestock over vast distances year around.

Service to the western and southern extensions of the rail system has been deteriorating for years. The shortage of rolling stock and the allocation of cattle wagons for transporting cash crops and other high value cargoes are responsible for the low rates of movement (8% a decade ago) of cattle from the Nyala railhead (HTS 1976b:79-80). Merchants may have to wait several months for wagons they have ordered to arrive. And the trip of 5 to 8 days from Nyala with no water or feed en route can kill cattle conveyed in this manner: "After several such experiences merchants are no longer interested in railing cattle" (ibid. p. 80).

The trekking route from Nyala, the largest producers' market, is more than 1,400 km from Omduran, Sudan's largest consumers' market, situated on the outskirts of Khartoum. Trekking time between the two points is some 50 to 60 days. By far the biggest obstacle in the way of trekking livestock on the hoof, aside from sheer distances, is the seasonality of fodder and water en route. Fodder becomes sparse in the dry season and may disappear altogether during years of drought. And no network of feedlots lies along the route. Bore holes following these circuits are poorly managed and not large enough in number.

Basement complex land forms, covered by sand sheets and dunes, militate against surface and subterranean water storage. All of these factors combine to restrict the commercial outflow of livestock from the western Sudan and thus relieve mounting grazing pressures (Khalifa et al. 1985).

Development administration

Information available for the preparation of this section pertains entirely to Darfur region. Most likely Kordofan experiences similar problems, though probably not to the same degree, given its greater proximity to the nation's capital. The Regional Government flatly states that Darfur lacks the technical staff and budgetary support for a major expansion of resource conservation and development programs (Regional Government of Darfur 1985:8). There is not even a planning unit within the Regional Government to monitor desertification and prepare a detailed rehabilitation and development plan for the region. While regional authorities have perseveringly pushed for institutionalizing controls on desertification through revegetation, water harvesting and other means, land management projects still sit on the drawing board or service small areas of undisturbed land.

Darfur's chronic shortage of extension personnel underlines just the human resource problem standing in the way of desertification control. The extension workers to farmer ratio has been put at 1:30,000 (Trail 1985:12), and the Darfur Regional Government (1985:annex 1) estimates 1 worker for every 5,222 families. Trail (op cit. p. 12) mentions a rule-of-thumb guideline of 1 worker to 600 farmers advocated by a World Bank study. This figure, he points out, is based on a centralized Training and Visitation System. But even if worker-farmer ratios higher than this could be handled in the program-poor environment of Darfur, the manpower roster would still require a substantial beefing up for ecological reforms to reach most farm families and serve them properly.

Planning and implementing development programs and projects must involve input from local government authorities. Darfur's experience with participatory government is relatively new, dating back to 1970, and this lack of

maturity gives ground for doubting the regulatory capabilities of local and regional government councils. Regional poverty is another hindrance. Recurrent droughts deplete or eliminate revenues expendable for schools, dispensaries, and other facilities for which local authorities can take credit. That tribal authorities are often reluctant to share their traditional responsibilities with council bodies further interferes with the functions of the latter. Cooperation barriers also frustrate coordinated efforts at inspecting and controlling range enclosures, enforcing forest conservation laws, and settling boundary disputes between tribes.

RAINFED DEVELOPMENT PROJECTS IN THE WESTERN SUDAN

Three major development projects fostering rainfed agricultural production and animal husbandry operate in the western Sudan. Run by the Western Savannah Development Corporation (WSDC), and started up officially in 1982, the Western Savannah Project (WSP), covers an area of 135,000 km of land in the northwestern outrance of South Darfur. And the Western Sudan Agricultural Research Project WSARP), headquartered in North Kordofan, serves Kordofan region and portions of Darfur. Conceived in the middle to late 1970s, all three programs are administered by public corporations affiliated chiefly with the Ministry of Agriculture and co-financed with loans from international agencies. A decade ago, ILO (1976) argued forcefully for stepped up momentum toward redressing an egregious imbalance in investments between the capital starved rainfed sector of the country, occupied by the bulk of Sudan's farming households, and the heavily subsidized commercial schemes situated in the Nile Valley. The projects under discussion reflect a measure of the government's commitment to rectifying this investment bias.

The content and special aims of the projects vary--only WSDC for example offers a program of controlled settlements. Taken together, the programs represent separate packages of solutions bearing on problems common to the entire region. Within this regional perspective, the more prominent components, involving crop production development and natural resource conservation, can be

mentioned irrespective of the specific projects under which they operate.

Settlement

Four settlements occupied by 1,500 tenant families have been established, with at least three more in the works. Twenty-year lease agreements, access to project extension services, availability of agricultural inputs, and farmers' compliance with tree planting and other tenancy stipulations in the line of soil conservation will, it is expected, strengthen the region's agricultural economy if the settlement experiments succeed and can be multiplied cost-effectively. They represent an unusual attempt by the government to achieve agro-pastoral change in the western Sudan through land tenure reform.

Agricultural Research Stations

Trials are run on a variety of crops. Special attention is given to finding new millet and sorghum varieties resistant to droughts, bird and insect change, and disease. Experiments dealing with phosphate fertilizer applications, crop rotation schedules, and inexpensive animal traction for ploughing and seeding are also undertaken. Some stations have extension outreaches and farmer/staff training programs.

Water Resource Development

Boreholes, and to a lesser extent dams, supply residents of Darfur and Kordofan with most of their dry season water. By far the highest development priority involving water resources is the maintenance and rehabilitation of pumping machinery and accessory structures. Water harvesting technology is discussed by planners but has not yet been deployed on a large scale.

Afforestation

Agroforesty does not rank prominently in the development programs of these three major projects, although some of them are establishing nurseries and shelter belts in villages. The biggest drive in the realm of forestry management can be credited to the government's Desert Encroachment Control and Rehabilitation Program (DECARP) which covers 650,000 km primarily in Kordofan region. DECARP activities include three tree planting programs: sand dune fixation, shelter belt establishment, and gum belt restocking (Hammer 1982; UNSO 1984). Regional and village nurseries for the production of Acacia Senegal seedlings, gum collection centers, and forester training programs in community extension techniques are important elements in these initiatives. All arboriculture projects are still at the very early stages of implementation.

Livestock Production and Health

Baseline surveys have been carried out on herd composition, animal productivity, grazing management, and the physiological parameters of breeding. Supplementary feed and veterinary trials are conducted, and ecologists have completed feasibility studies for seeding rangelands with edible grasses and forage legumes. A few communities are cooperating in deferred rotational grazing experiments, although the group ranch concept has yet to take hold. One of the programs has also been engaged with the Veterinary Services Administration in the distribution of vaccines to cattle herders.

DROUGHT IMPACTS ON DEVELOPMENT PROJECTS

Development projects cannot control climate, only its effects. Research all too often takes little explicit account of drought impacts on projects, as if project-environment relations were strictly one-way. Western Sudan research is no exception in terms of quantitatively registering development project performance over different climatic situations. This much can be said. Arguably, drought at best retards the progress projects make in years of good to moderate rainfall. While drought-tested resilience, for now, cannot be

evaluated rigorously, it is still useful to indicate in general terms how some key project operations function during trials imposed by droughts. Five major operations can be considered.

Settlements

WSP documents and field interviews leave no doubt that the 1984 drought dealt settlement plans a serious setback. If only a third of all refugees officially estimated to have migrated to South Darfur during the dry years of 1983 and 1984 stay where they are indefinitely, spontaneous settlers will deplete land reserves in line for controlled settlement. The problems are that these migrants will be difficult to uproot in the event that settlement authorities elect to appropriate the land they are occupying, or by the time it is considered for registration, that land will be so badly degraded as to be unsuitable for settlement purposes.

In many cases, house building, field clearance, and planting activities were curtailed, crop rotations prescribed by settlement authorities were suspended, and community service programs, including primary school construction, were put off in 1984 and 1985. Millet fared so poorly that some farmers had to postpone a move into the settlements, lacking millet stalks required for house and fence construction. For some peasants, hunger precluded long distance movements, to say nothing of the effect it had on the clearing of bush for sowing in 1985. Many farmers did relocate and clear land, but sizeable numbers could manage the preparation of no more than half the acreage they would ordinarily cultivate.

For the settlements to get off to a quick and orderly start, male household heads would have had to be on hand for meetings, and for assignments on domestic and communal work projects. A first order of business for farmers was selecting settlement committee officers who would oversee emergency food deliveries, handle disputes, and work with the authorities toward finalizing lease agreements. This was slow going by reason of the departure of a number of men for employment in towns and large agricultural schemes in Kordofan and the Nile Valley. Labor shortages on the settlements, the halting pace of committee formation, and

the exhaustion of disposable incomes brought most construction projects to a standstill. And the drought deterred farmers from putting much acreage into cash crops during the 1985 rainy season. Laying away cereal reserves in the event of another major drought mattered the most. Consequently, households would have less cash saved after the harvest for investing in settlement operations than project managers had hoped for. In some cases this strategy also meant that pedologically beneficial practices of crop rotation, expounded by management, were abandoned in 1985, as groundnuts and sesame were taken out of the crop rotation cycle, in favor of continuous planting of millet and/or sorghum.

Deforestation

Droughts are an anathema to arboriculture projects. Protracted dry periods can destroy large numbers of trees, such as Acacia Senegal, the primary source of gum arabic in the Sudan. Tree and seedling destruction in nurseries and forest preserves not only sets back reafforestation programs for combating desertification, but also contributes to fallow reduction in communities where trees are claimed as personal property and cannot be cropped without the owner's permission. Once the trees go, encroachment on fallowed land becomes easier, since ownership rights to idled land are more ambiguous than they are to cropped land, especially where farmland is scarce.

Another type of trespass involving tree survival pertains to drought beleaguered camel herders originating from semi-desert reaches in North Darfur and North Kordofan, into savannahs farther south, where they remain for as long as several months. Their camels strip acacia trees of bark, and valuable trees are pollarded to feed camels and small stock. Finally, firewood offers one of the few readily available sources of income for drought afflicted families bereft of livestock and crops.

Seed Production

Droughts can set back the progress of crop trials conducted at agricultural experiment centers stationed near farming communities. Suppressed crop growth diminishes the volume of seed to distribute and retards the communication of information to farmers about these seeds. More scientific experience with new seeds generally accumulates with more trials, especially in early stages of experimentation. In addition, the greater the number of trial runs, the more exposure farmers have to information about seed performance off the farm, thus increasing their propensity to adopt successful varieties. In North Kordofan INSORMIL researchers discovered that cooperating farmers withhold information about new seed products until their success is demonstrated, and note that "recent droughts have handicapped the evaluations and slowed the spread of information" (Coughneour and Nazhat 1985:vi, 42). Finally, it is unknown how many cooperators move away for long periods in search of wage labor in drought years, but certainly their departure does not facilitate the continuity of agricultural experiments or the communication of experimental results to the community.

Water Resources

Droughts drive up household wateryard fees, as many families consume water entirely from this source when surface pools and dams disappear. Some families make water rates more affordable by sending away members to towns or mechanized schemes for the remainder of the drought (Reeves and Frankenberger 1982). Water consumption expenditures interfere with household investment options for farm improvements.

Range Management

Drought is notoriously inimical to rotational grazing components of range management planning. Typically, cattle overgraze dry season pastures, while pastures reserved for wet season cattle use take in invading camels and small stock belonging to nomads who descend into the savannahs from the north. Programs for reseeding rangelands make

little or no headway, and forage production experiments on open and enclosed ranges yield atypical results.

CONCLUSIONS

The western Sudan is vast and depressed economically, in part owing to relatively infertile soils, low, erratic rainfall, and deteriorating natural resource endowments. Rainfed subsistence cultivation and herding dominate the regional food production base. Water limits economic opportunity like no other environmental factor, and rainfall deficits have been the norm for 18 years running. Aggravated by degrading soils and retreating climax vegetation, drought effects have reached a new benchmark. Drought affecting rainfed farmers and herders will result in food crises as never before. Over the years the national government has come to realize that measures must be taken immediately that will arrest desertification and shield peasants from drought-related distresses. A number of programs conceived with these ends in mind came into operation recently, since 1980, with international assistance. Lately they have been through some rough trials, stemming from serial drought years, culminating in the drought and famine of 1984.

Do these projects blunt drought impacts any better than do the communities they serve? If not, and they falter, how then will they sustain the farming systems dependent on their help? Thoroughgoing answers are still a long way off. The projects are fairly new, so that assessing their resilience before they reach full strength may be premature. Their dependence on cooperating agencies of the government should also be borne in mind. Project staff is mostly seconded from government ministries which also provide partial funding and stores of equipment and supplies. Registration of land, permits for drilling wells, setting up producer cooperatives, and many other project enterprises require approval from government authorities. Major reforms in decentralization affecting state bureaucracy at all levels and the financial straits in which Sudan has found itself in recent years have debilitated all government bureaus connected with the projects. How many project shortcomings evident during drought emergencies inhere in

project design or arise from the handicapping influence of an unstable and impoverished administrative environment is impossible to judge without appropriate information. Finally, the data are extremely limited which permit incisive comparisons between project performance in drought and non-drought years, and between communities inside and beyond the project area.

All the same, general conclusions can be drawn to point to research needs. Experiments of all kinds involving crop development fall back by at least a year, and staff wastes valuable time selecting and measuring fields for crop surveys. Livestock mortality, undernutrition, and migration take a year or more away from animal traction trials. Almost every settlement component slides behind schedule by several months. Even more serious problems are created by famine refugees who unwittingly block plans for settlement expansion into unoccupied lands.

After-effects during the following year are evident in farmers' propensities to put off full-scale cash crop production. This means deferred crop rotations and reduced savings for investment in farm improvements advocated by project management. Post-drought poverty and the late return home from drought/dry season employment centers in towns or mechanized agricultural schemes result at times in on-farm labor shortages during the critical sowing/first planting phases of the agricultural calendar. This thwarts the household's chances to capitalize on innovations delivered by the project and takes away from crop profit margins (for investment).

So projects lose vital information during droughts. They lose clients, temporarily anyway, who leave the project area for work at distant places. They lose assets such as land and bore hole equipment which breaks down from overuse. Their crop and seed outputs decline. Their beneficiaries have less wherewithal to take advantage of project services, and income is lost from programs financed through cost recovery. And they slip a step backward in their march on desert encroachment, as droughts and commercial firewood collectors pressed hard for cash take down trees and bushes, and nomads overgraze dry season pastures. All three projects have survived recent droughts, and no doubt they may eventually accomplish certain aims in

the long run, but how long that will take and at what social and economic costs are open questions, given that drought crises will recur in the western Sudan. Research will certainly be needed to measure costs incurred from droughts and determine the areas of project-farming system operations which can be modified to reduce the scale of these costs to the project and to beneficiaries.

NOTES

1. The argument here is that in the short-run at least, water points supplied to drought prone areas lead to the degradation of plant communities adjacent to these points by attracting concentrations of people and livestock under a regime of traditional land use. Unlike irrigated water, well water does not renew soil nutrients lost through human/livestock settlement. It should be noted that the terms "land degradation" and "desertification" will be used interchangeably throughout.

2. The total land area of Kordofan and Darfur, 890,888 km , contains a population of approximately 6,343,756 persons, or about a third of the population of the country, according to 1983 census figures. Sudan is Africa's largest nation.

3. One feddan converts to .42 hectares.

4. Wateryards are fenced stations containing two or three boreholes, taps, and troughs. They are staffed with a government clerk who collects water fees from yard users.

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COPING WITH FAMINE, DROUGHT, AND WAR IN SUB-SAHARAN AFRICA

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Famines, droughts, and wars have been too frequent in Sub-Saharan Africa during the past three decades. Millions of Africans have died as a result of these disasters; millions have been (and millions remain) uprooted. Anthropologists and other social scientists have documented some of these events. The objectives of the anthropological research have been to understand (1) the ways that sociocultural institutions function to buffer people from disruptions of various kinds, (2) the strategies that people employ to cope with perturbations of whatever variety that threaten lives or sociocultural patterns, and (3) the social and environmental consequences of disasters and people's responses. Unfortunately, traditional definitions and divisions within research have limited the scope and insightfulness of this documentation and analysis and restricted their use as guides for policies and programs.

Drought and famine are defined misleadingly as natural disasters, and the study of these phenomena is separate and isolated from the studies of war and refugees, which are defined as sociopolitical (and sometimes religious) crises. These definitions and divisions express assumptions about the natures of nature and of disasters that are unsupported

by our evidence. A "natural disaster" assumes that it is not controllable by people or not essentially defined in human terms. A physical or climatic event (flood, earthquake, hurricane, etc.) by itself is not a disaster. The event becomes defined as a disaster only because of its effect on human affairs. Also, the physical world and its climate have been and continue to be affected to varying degrees by human activities, so the term "natural" does not mean unmodified or uninfluenced by sociocultural activities. Besides, famine during recent decades has become primarily a consequence of political and economic factors.

Studies of famine, drought, and refugees also are separated for the most part from analyses of the processes of structural transformation through which previously more self-reliant and smaller-scale societies become incorporated into colonies (now nation-states) and global capitalist economies. These divisions between natural and sociopolitical and between disasters and incorporation or transformation fail to recognize or ignore the importance of the evident similarities and patterned variation in coping strategies and buffering mechanisms that are operative in all of these situations. We must disregard these traditional categories and study as a whole this range of crisis-and-response situations in order to arrive at a more comprehensive (and more useful for policy and program recommendations) understanding of the underlying structures and processes, and their variability.

Finally, theories of social change and continuity need to become more inclusive. Current theories tend to stress legal, moral (normal), and legitimate behavior and access to resources. Studies of popular responses to disasters reveal the simultaneous (and sometimes sequential) use of both legitimate and illegitimate (theft, raids) strategies and tactics. Current theories also treat severe disasters, i.e., catastrophic events that interrupt normal life, as "outside the model," since normal life is all that the theories can handle. Times of war and of peace, of famine and of plenty, need to fit "inside" the theories. There may exist alternative structures and sociocultural institutions that are appropriate during and after disasters, but the existence of these alternatives must be related to normal structures and institutions for a theory of social change and continuity to be effective. Cultures are not clay cups to be broken.

This article begins by discussing definitions of types of crises (survival, cultural, and natural), after which drought and famine are defined and their assumed causal linkage is explored. A study of Nigerian famines reveals how political and economic factors become more causal as local societies become more incorporated. Amartya Sen's entitlement approach is then presented in some detail because it provides a more holistic analytical perspective (unencumbered by many of the misleading definitional separations noted above) and a means of integrating macro-level and micro-level studies of disasters, transformations, and consequences. Several studies of buffering mechanisms and coping strategies in various societies (primarily African) are then placed in an order representing a continuum from less to more incorporated. Many similarities are seen, as well as two general variables, in this evolutionary perspective. Involuntary migration is a consistently noted coping strategy. Since refugees may be simply defined as people who chose that strategy (as well as, perhaps, other strategies), the study of refugees belongs obviously in the more holistic analysis of human responses to crises.

Crises: Cultural, Survival, and Natural

A cultural crisis "involves the disintegration, destruction, or suspension of some basic elements of sociocultural life" (Bidney 1953:348). Survival crises threaten the physical existence of the individual or population. The two types of crises may occur independently, i.e., one crisis may threaten a person's life without threatening sociocultural continuity, while another crisis may threaten sociocultural life without physically threatening anyone's life. Survival crises may be objectively recognized by those being threatened and by observers who do not share the same cultural definitions. Cultural crises may not be objectively apparent. In Africa today anthropological research focuses on situations that combine cultural and survival crises. People's physical survival and sociocultural continuity are threatened by drought, famine, and war.

Drought and famine are often perceived to be natural disasters, i.e., the causes are nonhuman, while the causes of war with its attendant refugees are political (and sometimes socioreligious). Bidney (1953) accepted this distinction

between natural and sociocultural causes (whereas this article questions the significance of this distinction and notes changes in the causality of famine) and reflected how both types of crises (cultural and survival) could be caused by both types of causal factors.

> Natural crises are those suspensions of sociocultural life brought about by factors more or less beyond human control...Survival crises may originate from either natural or cultural causes. All natural crises, such as the processes of birth and death, earthquakes, floods, drought, famine, and so forth, are survival crises (Bidney 1953:348, 355).

Bidney used the variable of human control to distinguish natural and cultural factors. Natural factors are "more or less" beyond our control. At the same time, all natural crises are seen to threaten physical survival. What this really means is that interactions between humans and their natural environment are not defined as "crises" unless human life is physically threatened.

Anthropologists are cautious about our usage of the term "natural" for several reasons. A landmark volume, Man's Role in Changing the Face of the Earth (Thomas 1956), illustrated clearly how we live in a man-modified world. The influence of humans and our application of technology have transformed the physical world about us so that the natural landscape is to some extent a function of human activity. This makes it impossible for us to clearly formulate an opposition of nature and culture because culture has influenced nature. The ambiguities of natural factors are illustrated in defining drought, famine, and the relationships between them.

Drought Defined

> Drought is a subjective phenomenon. People have expectations...(and use the term) 'drought' to describe situations where rainfall performance does not meet these (Fleuret 1986:224).

Definitions of drought are about the relationship of water to human needs and expectations. Drought may be defined in several ways, reflecting the topical or disciplinary interests of the observer. A meterological definition considers drought in terms of rainfall. Drought occurs when "rainfall is substantially below its climatological expectation" (Bhalotra 1985:9). Glantz (1987a:45) quantifies this as "a 25% reduction of the long-term average rainfall" in a region.

A hydrological definition depends on ground water supplies. In this sense, drought exists when there is "the rapid depletion of surface water and a fall in the level of reservoirs, lakes and rivers" (Bhalotra 1985:9). This really depends upon the level interrupting or threatening human activities (Glantz 1987a:46), reminiscent of Bidney's definition of natural crisis in terms of threats to human survival.

A third definition is agricultural: Drought means "inadequate soil moisture to support growth of plants and crops to maturity" (Bhalotra 1985:9). This requires a certain distribution (not just a total amount) of moisture throughout the growing season. Another agriculturally-oriented definition uses rainfall but distinguishes between crop and animal requirements. Arable (or rainfed) crop production is more vulnerable to variations than is animal production, so "relative rain failure" may be functionally subdivided into "arable and livestock droughts" (Hay et al. 1981:1). Using this distinction, Hay et al. noted that arable droughts occur in Botswana on the average of two to five years in every ten, while livestock droughts occur no more than two years out of every ten.

An economic definition recognizes drought when there is "a rainfall-induced shortage of some economic good...brought about by inadequate or badly timed rainfall" (Sandford 1977, 1978:34). Sandford (1978:37) continues to "define degrees of drought in terms of the size of the deficit between the amount of (the economic good in question)...required in any region in any one year and the amount supplied." Probabilities of drought thus depend on changes in rainfall, environmental productivity, development programs, and population size and requirements.

A final definition views drought as "a period in which moisture availability falls below the current requirements of

some or all the living community in an area and below their ability to sustain the deficit without damage, disruption or excessive costs" (Hewitt and Burton 1971, as quoted in van Apeldoorn 1981:8). This almost returns us to the definition of cultural crisis presented by Bidney and clarifies the point that almost all of the definitions cited above restrict the term "drought" to situations in which the relationship between water supply (commonly as rain) and human needs is critical, i.e., at a crisis level. Drought is defined in terms of human needs.

Human activities may be contributing to the onset or severity of drought. Rainfall may be reduced, and temperatures, atmospheric dust, and evapotranspiration rates may be changed as consequences of human-induced desertification (Nicholson 1986). The extent of human influence is controversial, but the possibility that current droughts are another example of man-modified environments (Thomas 1956) undercuts the "naturalness" of drought and the utility of continuing an arbitrary separation of crises according to their supposedly natural or social causes.

Famine Defined

Famine may be defined broadly or more narrowly. The more narrow definition includes only one kind of starvation. It is this more narrow definition that is used more often in analyses of the African situation.

> Famines imply starvation, but not vice versa...Starvation is a normal feature in many parts of the world, but this phenomenon of regular starvation has to be distinguished from violent outbursts of famine...Starvation is used here in the wider sense of people going without adequate food, while famine is a particularly violent manifestation of its causing widespread death...In analyzing starvation in general, it is important to make clear distinctions between (sic) three different issues. (1) lowness of the typical level of food consumption; (2) declining trend of food consumption; and (3) sudden collapse of the level of food consumption. Famine is chiefly a problem of the third kind (Sen 1981:39-41).

The broader definition considers famine to occur when there is "the semi-starvation of many people--a substantial proportion of the population in some sizeable area" (Keys et al. 1950, as quoted in van Apeldoorn 1981:12). This definition includes the epidemic as well as the endemic or chronic situations, the epidemic being when local foodstuffs cease to be as available as they are normally (the commonly accepted famine case), while the endemic refers to the chronic malnutrition of the poor anywhere (the "silent famine").

Other situations of food scarcity would fit in the broader definition. Richards (1939) noted a normal period of seasonal hunger or starvation among the Bemba of Zambia, and these anticipated "hunger months" have been identified among many farming societies that have only one harvest per year (Okere 1983; Allan 1965). Similarly, the term "feast or famine" is assigned to the normal rhythm of meat availability among many hunting and gathering societies, although it is debatable whether they are really in a recurrent famine situation (Lee 1968; Sahlins 1972).

Drought and Famine

Drought and famine have been linked in people's minds, both in a general way and in relation to Africa in the 1970s and 1980s. The droughts in the Sahel and Ethiopia were seen by many as the direct (and sufficient) cause of the famines. Lofchie (1975) pointed out how research agendas reflected the assumed relationship.

> Social scientists have so taken it for granted that the causes of African famine are natural and climatic that most of their literature on the subject falls into the genre of 'impact studies' which omit the issue of causality and deal almost entirely with the social and political aftereffects (Lofchie 1975:551).

He went on to characterize several disciplines, including anthropology. He noted, "Anthropologists have largely centered their attention on the deterioration of traditional institutions and cultural practices" (Lofchie 1975:552). This is true, and our continuing emphasis on local level and

indigenous (or traditional) buffering mechanisms and coping strategies reflects this "impact studies" orientation. Although the anthropological discussion of reactions to drought and famine usually does not address whether drought causes famine, the accustomed correlation (drought and famine) strengthens that assumption.

Trends in African food production indicate that drought is not the singular cause of famine but only one of several contributing factors. Food production per capita was declining before the drought in the late 1960s and early 1970s and continued declining between that drought and the drought in the early 1980s (Guthrie 1986:93). Food production also continues to decline "in countries only marginally affected by the climatic problem" (Lofchie 1975:5654; McMillan and Hansen 1986:4-5; Lemarchand 1986:33). This evidence distinguishes between decline in the availability of food and drought, but the argument indirectly continues to link localized production and stores of food with famine and with drought through intervening political and economic variables.

Van Apeldoorn's (1981) study of Nigerian famines during this century (1903-05, 1907, 1913, 1921, 1927, 1930, 1942, 1951-54, and 1972-74) noted the diminishing importance of localized food production and the increasing importance of transportation and communication systems, warfare, government requisitioning of food and labor, taxation, private and government grain storage, political decisions such as closing international borders, and private traders "cornering the market" in foodstuffs. Early in this century a widespread drought was much more likely to result in famine, but improved transportation (especially long-distance trucking) later permitted the importation of foods from other areas. The 1930 famine was the last one in which local shortages of food were determinant; after that (by 1942) the changes in transportation and communication led to a "capitalistic character of food crisis" (Watts and Shenton 1978, as quoted in van Apeldoorn 1981:37). A Nigerian informant in 1973-74 was quoted as saying, "At the present time, provided one has the means, one finds something to eat...Today people die of hunger only if they do not have the means" (Laya 1975, as quoted in van Apeldoorn 1981:frontispiece).

The drought-famine linkage is based on the belief that famine is caused by an absolute shortage of food, and drought causes local production (and thus local food supplies) to fall or fail. Criticism of the linkage centers on its theoretical isolation of the local society and ecosystem from an enveloping nation and world and its failure to recognize the importance of political and economic relationships (Watts 1983). This is essentially the same criticism made decades earlier about community studies and their artificial and misleading alienation of the unit of analysis (the community or the peasantry) from influential and largely determinant political and economic relationships.

Although it is an acceptable scientific research strategy to isolate certain factors or relationships in order to better study them, the acceptance is conditional on the consciousness and explicitness of the decision to isolate. When the isolation is not part of an explicit strategy, then it may reflect a naive assumption that the isolation is (in some sense) "natural." This assumption may reflect the strength of "the tradition of thinking in terms of what exists rather than in terms of who can command what" (Sen 1981:8).

Poverty, Individual Entitlements, and Famine

Sen's analytical framework is a valuable protection against the traditionally restricted linkage of famine and natural causes. His approach considers a wide range of ways through which people can gain access to food or other critical resources. This shifts the analysis from a focus on regional resources to changes in individual and group access. Sen argued that famines are not a direct result of food shortages or an unfavorable population-to-food ratio, i.e., famines are not natural or demographic in origin. Famine is not a blanket condition affecting equally the entire population in a territory. Some residents may starve while others do not, and while some may be exporting foodstuffs from the area where famine is occurring (Sen 1981:161). He argued that:

> Starvation is the characteristic of some people not <u>having</u> enough food to eat. It is not the characteristic of there <u>being</u> not enough food to

> eat. While the latter can be a cause of the former, it is but one of many possible causes (Sen 1981:1, emphasis in the original).

Starvation and its massive manifestation in famine are the direct result of people not having the rights (through production for use or through exchange) to enough food to eat. The locality may have enough food, but the starving are not entitled to that food. "Starvation statements are about the relationship of persons to the commodity" (Sen 1981:1). Whereas anthropologists are more accustomed to speaking about rights, Sen uses the term "entitlement." This includes rights due to the individual's production of the good or service, as well as rights based on inheritance or exchanges of one good or service for another "through certain rules of legitimacy."

This approach is capable of analyzing social situations that range from self-reliance to fully incorporated. There are four categories of entitlement relations noted for a capitalist market economy (Sen 1981:2):

(1) own-labor entitlement: An individual is entitled to his or her own labor power and, therefore, products related to that power;

(2) production-based entitlement: An individual is entitled to the products that result from production based on the individual's owned resources (including capital) or on resources legitimately hired from other people;

(3) inheritance and transfer entitlement: An individual is entitled to goods and services that are willingly given by the legitimate owner;

(4) trade-based entitlement: An individual is entitled to goods and services obtained through legitimate trade with a willing party or parties.

In a society that recognizes private ownership and market transactions, a person may have rights to goods and services through various exchanges that are not possible in a kinship-based society. Whatever the rules legitimizing exchanges in the society, it is theoretically possible to describe the complete set of "alternative bundles of commo-

dities" that a person could acquire in an equivalent value exchange for the goods and services he or she directly controls. This set of bundles is the person's "exchange entitlement."

> A person will be exposed to starvation if, for the ownership that he actually has, the exchange entitlement set does not contain any feasible bundle including enough food...it is in this way possible to identify those ownership bundles--call them collectively the starvation set--that must, thus, lead to starvation in the absence of non-entitlement transfers (e.g. charity) (Sen 1981:3).

Absolute scarcity of local food supplies is only one way for the person to starve. Changes in the terms of trade are another way to starve, i.e., the person may still control the same quantity and quality of goods and services that used to be sufficient to exchange for enough food, but changes in relative prices may diminish the value of the owned resources. Changes in employment opportunities or wage rates that diminish buying (or exchanging) power are another way for an individual's exchange entitlement to fall into the starvation set.

Sen (1981) applied this theoretical analysis of the causes of starvation to four major cases to demonstrate why famines occurred. Two of these cases were African: Ethiopia in 1972-74 and the Sahel in 1968-71. Mortality estimates varied, but 100,000 or more deaths was a commonly reported statistic for each of the famines.

His data for Ethiopia showed little evidence of a decline in food availability throughout the country at the time of the famine, even though the famine "clearly was initiated by a drought...(which) causes crop failures" (88). The famine was caused by a combination of crop failure, which reduced the quantity of locally-controlled resources, and a "collapse of income and purchasing power...(that diminished) the ability...to attract food from elsewhere in Ethiopia" (94), i.e., a diminished exchange entitlement. There were transportation constraints but there were also reports that food was transported out of famine areas

during the famine period (94). The poor did not have an effective demand for food, that is, they lacked the market command to satisfy their survival needs.

The Sahelian countries of Mauretania, Senegal, Mali, Burkina Faso (then Upper Volta), Niger, and Chad suffered a drought or, at least, a period of low rainfall from 1968 to 1973, with 1973 being the major famine year. Sen (1981) noted that, "Nearly all the Sahelian countries had enough food within their borders to prevent starvation had the food been divided equally" (118), but the reduction of local resources (drought-related) was correlated with continuing major changes in the distribution of purchasing power acting against the drier Sahelian regions of the six countries. People starved because they lacked "command over food at the family level and not merely at the national level" (125).

Sen's focus on individual and family access to food and other resources provides a theoretical linkage between macroeconomic and ecological variables and anthropological analyses of buffering mechanisms, coping strategies, and tactics. Although his approach establishes individual variation in access, and variation over time, Sen does not address how people respond dynamically and attempt to cope with scarcities and crises. He does note that there is a continuing trend of increasing vulnerability due to increasing commercialization and "the partial breakdown of the traditional methods of insurance" (127), or buffering mechanisms, coping strategies, and tactics, but he does not deal with the socioeconomic dynamics of responses to crises that concern anthropologists.

Buffering Mechanisms, Coping Strategies, and Tactics

Anthropologists assume that people are to some extent rational and instrumental, that cultures and social organizations represent more or less successful relationships between peoples and their nonhuman ("natural") environments, and that culture and social organization provide ways for people to adapt to at least some cultural and survival crises. These statements are all qualified because there are instances and circumstances in which people act in non-economizing ways, cultures and social organizations are relatively unsuccessful, and crises are temporarily or

permanently overwhelming. Famine, for instance, represents a survival crisis that at least some people fail to surmount and that appears to demonstrate an adaptive failure at the systems level of culture and society, although Malthusians might consider the famine a systemic adaptation.

Buffering mechanisms, coping strategies, and tactics represent ways that individuals and societies respond and adapt to crises. Although these three terms are not distinguished consistently in the literature, in this paper a "strategy" is a conscious plan, and a "tactic" is some behavior that is employed as part of the plan, while a "mechanism" is a relationship or factor that functions (without necessarily conscious direction) to promote human survival and adaptation. These strategies, tactics, and mechanisms intervene between drought (or any other perturbation) and famine (or other calamitous outcomes).

Understanding the causes of famine and how these have changed over time illuminates why coping strategies and tactics have changed as societies have become less autonomous, and analyses of responses to perturbations need to include historical changes in the total environment, in the mode of relationship between local and larger society, in the causes and control of disasters, and in choices and combinations of strategies and tactics.

Coping in Self-Reliant Societies

Colson (1979) identified some food strategies of people in self-reliant societies. These are "societies where each household expected to be largely self-sufficient: i.e., societies which follow the domestic mode of production, though even among these some trade is normal"(18). Individuals in these societies are conscious of the threat of recurrent scarcity of food, and Colson's historical perspective recognized the adaptive significance (functions) of many fundamental cultural and social features, whether or not they had been incorporated purely or consciously for their utility during crises. She identified four common mechanisms (1 and 3-5 below) and one strategy (2) that self-reliant societies had adopted to lessen their vulnerability:

(1) diversification of activities, rather than specialization or reliance on a few plants or animals;

(2) storage of foodstuffs;

(3) storage and transmission of information of what can be called famine foods;

(4) conversion of surplus food into durable valuables that could be stored and traded for food in an emergency;

(5) cultivation of social relationships to allow the tapping of food resources of other regions (Colson 1979:21).

The practices noted above occurred during good years. During the bad years of starvation or famine there were other strategies and tactics:

(1) using foodstuffs that were normally ignored (famine foods);

(2) using more conservative food processing techniques;

(3) trading accumulated wealth and capital for food;

(4) visiting kin in other places;

(5) travelling around region, migrating in search of food and work;

(6) dividing larger social groups into smaller ones, and sometimes sloughing off dependents;

(7) refusing to share foods;

(8) stealing (in earlier times, raiding) (Colson 1979:20, 25-27).

Following the bad year or years there were other mechanisms for the "post-famine crisis," that social and cultural crisis when people must confront other people whom they have slighted or injured, and when people must confront the discrepancies between the norms and values they espouse and their bad-year behavior.

> Communities were able to reemerge, and the people to deal with one another again, despite the common knowledge that they had behaved badly during the crisis: They had refused hospitality, hoarded food, abandoned relatives, stolen from one another. They had not forgotten or perhaps forgiven--they settled for amnesty (Colson 1979:27).

Note that stealing (raiding or warfare) and visiting relatives were listed as possibilities. These are illegitimate and legitimate procedures people have often employed to appropriate other people's resources in times of need (Vayda 1969; Webster 1979). This shows how Sen's conceptual schema is theoretically deficient for a comprehensive analysis of cause and coping, continuity and change. Entitlement relations connect "one set of ownerships to another through certain rules of legitimacy" (Sen 1981:1). Some human mechanisms and strategies are not legitimate: theft, raiding, and war.

Furthermore, Sen's framework addresses legitimate rights to possess goods (such as food) through transfers, but it is unclear to what extent charity and governmental relief are included. Almost by definition, charity and relief are not subject to rights, i.e., a person has no right to charity and definitely no legitimate power to demand it. A person may claim legitimate rights to assistance from his or her own government, but again there is the variable of power to make that claim effective (Watts 1983). The illegitimate procedures of war, raiding, and theft are also related to power, as is the commonly cited phenomenon of involuntary migration.

Coping in Incorporating and Incorporated Societies

Incorporation into a larger political and economic unit restricts some earlier procedures such as warfare, modifies or eliminates some adaptive mechanisms, and opens up new possibilities. Van Apeldoorn's (1981) study of Nigerian famines documented the importance of improved communication and transportation links among incorporated areas. Local food shortages could be determinant earlier in triggering famine in a locality, but incorporation means that

alternative supplies of food are available elsewhere. Various authors have interpreted this to have positive or negative consequences, i.e., the change diminished or increased the possibilities of famine occurring.

Van Apeldoorn (1981) noted five major categories of coping strategies for rural people who live in monetized incorporated societies and are threatened by drought and famine. The primary strategy is to move away, i.e., attempt to exploit non-local resources (involuntary migration). This may occur with or without the agreement or prior knowledge of other family members, i.e., some desert their families to fend for themselves. Those who remain at home utilize four local strategies:

(1) adapt agricultural practices, including changes in hectarage, crop mixes, irrigation, tools and labor;

(2) search for alternative food sources from sylvan areas and from trees, plants, or animals on the farm;

(3) depend on others, including remittances, kin, co-residents, begging, theft, governmental relief, and charity;

(4) earn money to buy food, including wage employment, disproportionate sales of livestock, borrowing, artisan activities, collecting, hunting, fishing, processing of agricultural products, and sale of possessions.

Other strategies were described, either explicitly or implicitly, that did not fit in the author's major categories:

(1) hoarding food and hiding it from relatives;

(2) diminishing the size of the household (if that social unit is defined as the group that shares food) by hiding food and by desertion;

(3) praying and other rituals, including cleansing the locality by chasing away (polluting) people of questionable morals;

(4) establishing, in good years, farm reserves of grain that could last for several years (May, 1987, notes some farmers holding ten-year reserves of grain in Burkina Faso);

(5) suicide.

Fleuret (1986) has outlined the strategies pursued by other rural people who are more enmeshed in a market economy. When confronted with starvation situations, these people rely more on their exchange entitlements through the market (and on governmentally-supplied relief) than on traditional or locally institutionalized coping mechanisms.

> Despite the diversity of traditional drought response mechanisms...It is access to cash through employment or through exchange that permits these rural households to survive times of crisis and achieve food security (Fleuret 1986:228).

In these survival crises, income is needed to buy food to supplement that produced through the endowment bundle. People raise cash through the market using a sequential set of measures:

(1st) sell livestock;

(2nd) work for wages;

(3rd) borrow cash and food;

(4th) sell valuables, jewelry, and firearms;

(5th) migrate (after a total failure of home production) and sell (or lose) capital assets, including land (Fleuret 1986:228, citing Cutler 1984).

Incorporation and Coping

There are significant differences in the ways the authors cited here and other scientists evaluate (or even recognize) the impact of incorporation on the human-environment unit of analysis and on the mechanisms and

strategies humans use to cope with crises. Colson, Sen, van Apeldoorn, and Fleuret describe social situations ranging from self-reliance to relatively complete incorporation into a capitalist world economy. Many of the mechanisms and strategies (such as migration) are the same with the major changes being:

(1) an increased reliance on money, market, and government; and

(2) a decreased remembrance of, facility with, and reliance on indigenous resources, both social and sylvan.

Crisis and disaster may be viewed "as the extreme situation which is implicit in the everyday condition of the population" (Baird et al. 1975:2, as cited by van Apeldoorn 1981:5; Torry 1986). Crisis and disaster stress, may partially change, and may in rare and extreme circumstances obliterate the social and cultural life of a population. Most frequently the mechanisms and strategies function so that all (or most) of the population make it through survival crises. Very rarely is a society completely annihilated or a culture obliterated. When this happens, it may occur through a natural agency (volcano, submersion of an island), war, or a comprehensive famine.

Stress and change are alternatives that our theories must handle, a reason why earlier structural-functional models were rejected or amended. Diffusion, culture contact, and independent invention are concepts that anthropologists have used to describe some different ways that societies are exposed to social and cultural alternatives. Incorporation into larger systems is another process that presents alternatives (sometimes optional and sometimes enforced) to the localized, often self-reliant, and (perhaps only conceptually) isolated societies that have been the traditional focus of anthropological enquiry.

If "natural" means environmental factors that are more or less beyond human control, then incorporation into the world capitalist economy and war are as natural as the forces of wind, water, earth, pest, plague, and fire to the great majority of people. If "natural" means separate from (untouched by) human behavior or alien in essence to the nature of humans, then a flood resulting from waters

captured by a dam is not natural, nor is a drought that is partially dependent on global deforestation. We and our actions are as "natural" as earth, air, or fire.

In any event, however "natural" is defined, disasters are defined in human terms. Levels of water are droughts or floods only as they impact human lives. Social scientists study human behavior and humans-in-environment. The extent to which the origin of a crisis affects human responses, the extent to which human action affects origins of crises, and the extent to which environmental features (human and nonhuman), relative location within the environment, and organizational or sociocultural features affect the frequency, type, and consequences of disasters are objects of study to be investigated. There is no established theoretical reason to separate war and flood, drought and the transition to capitalism, when we are analyzing general processes of sociocultural continuity and change.

Which economies and societies are most vulnerable to crisis? Self-reliant societies (the "poorest and least developed") and the most wealthy, complex, and developed societies may be less vulnerable than:

> Those societies in process of rapid transition or modernization, where the traditional social mechanisms for absorbing losses and sharing them among the community have been eroded away and have not yet been replaced by the accumulated wealth and response capacities of more modern societies (Burton et al. 1977, as cited in Colson 1979:27-28).

Social and cultural systems may be defined as complex mechanisms (or meta-mechanisms) that function to satisfy human desires and needs, one of which is for defense. Self-reliant societies have established a working relationship with their environment that suffices for most, but not all, crises. It remains to be proven whether the "developed" societies have established any self-sustainable relationship with their environment. Pollution, wars, exhaustion of irreplaceable (or only replaceable in geological time) minerals and fuels, and constant revolutionary activity are indicators that self-sustainability and development, as commonly defined, may be incompatible. "True development

is an ecological process in which a 'society' increased its capacity for dealing with the environment, including extreme environmental conditions that produce disaster" (van Apeldoorn 1981:7, citing Baird et al. 1975; O'Keefe 1975). Societies in transition from self-reliance to capitalist or socialist "development" are vulnerable because they lost the control they used to exercise over a limited environment and have not gained sufficient power to control the resources of the world they share (Watts 1983).

Sen (1981) would respond that societies are not the vulnerable units but individuals, and individuals who starve in any society are those without adequate resources (whether political, economic, or social) to demand effectively the foods that they cannot produce. Visiting kin and travelling in search of food and work are both forms of involuntary (crisis-based) migration, a common response that allows people in self-reliant and incorporated societies to escape localized scarcities. Refugees in a general sense are defined as those people who chose the migration strategy.

Refugees Defined

Migration is mentioned by almost everyone as a (sometimes as the) coping strategy for people confronted with drought, famine, or war. This migration could be called involuntary, forced, or unplanned (Hansen and Oliver-Smith 1982).

> All migration implies some degree of prior relative deprivation. People decide to move away because some needs or desires are not being adequately fulfilled in their present location...forced migration is distinguished from voluntary migration by the diminished power of decision in the former...Although natural disasters are not mentioned by most theorists as a cause of forced migration, the same element of powerlessness applies...A change or changes in the environment that are detrimental to the individual or collectively deprive the collectivity (or various members of it) of security and established new, more dangerous conditions (Oliver-Smith and Hansen 1982:3-4).

The status of refugee has been defined in various ways, each definition reflecting the orientation and intentions of its authors. All of the definitions place these people and their behavior within the scope of an integrated study of human responses to crises.

In 1951 the first United Nations definition (Convention Relating to the Status of Refugees) restricted itself to events occurring before 1951 and allowed signatory nations to further restrict the definition to events occurring in Europe only. This was modified by the U.N. in 1967 (Protocol Relating to the Status of Refugees) that eliminated the date and location restrictions (Brooks and El-Ayouty 1970b:225; Melander and Nobel 1978:87, 1979:24).

In 1969 the Organization of African Unity (Convention Governing Specific Aspects of the Problem of Refugees in Africa) accepted the U.N. definition and added other conditions that moved away from the individualistic and psychological criteria of the U.N. definitions (Brooks and El-Ayouty 1970b:272; Melander and Nobel 1978:92, 1979:118). Objective conditions of unrest, war, or domination were sufficient cause. Both U.N. and O.A.U. agreed, however, that international travel and certain causes (persecution, unrest, war, etc.) were necessary.

Legal, political, and administrative definitions attempt to precisely delimit the refugee status "to establish dichotomous categories (refugees and non-refugees)" (Zolberg, Suhrke, and Aguayo 1986:153). The status is fixed, and people are also defined as "convention refugees and de facto refugees" (Weis 1978) or refugees versus "victims of hostilities" (Wenk 1968) in order to assign responsibility for helping the unfortunate to a nation state or to the United Nations. This is very important for the welfare of uprooted people, for international agreements on the responsibilities of national states, and for the formulation of national policies, but these distinctions may not be relevant for our scientific understanding of general human patterns of response to crises.

Coexistent with the restrictive definitions noted above are much broader ways in which the status of refugee continues to be used by academics, politicians, and the general public. Brooks and El-Ayouty (1970a:XI-XV) broaden

the status to include people moving for economic reasons. "They are not refugees in the political sense, but that is their very real condition in terms of the cutting of old ties and the building of new."

President Nyerere of Tanzania, in his speech to the First International Conference on Assistance to Refugees in Africa (ICARA I), defined refugees as "people who are now, or may in the future be, forced to flee from their homelands and seek refuge in another country in order to escape persecution, or death, or starvation" (as quoted in CIMADE, INODEP, and MINK 1986:142). He also remarked that the 1967 O.A.U. conference on refugees divided them into three categories: (1) "the political refugees, who are mostly urban dwellers, and to a greater or lesser extent educated people"; (2) "freedom fighters, who are in a special position"; and (3) "the most numerous...(consisting) of men, women and children fleeing from war, from racial, religious, or cultural persecution or conflict, and from famine or other natural disasters" (144-145).

Refugees (plus the uprooted victims of hostilities who did not cross an international boundary) by definition chose a coping strategy of migration, although that may have been only one of the strategies they employed. The Angolan refugees I studied in Zambian border villages utilized almost all of the types of strategies, and benefited from almost all of the mechanisms, described above by Colson, Fleuret, and van Apeldoorn (Hansen 1978, 1981, 1982).

Conclusion

Famines, wars, and droughts are human tragedies. People cope as best they can, and their suffering and success are influenced by the severity and characteristics of the crisis, the socioeconomic features of the society, the personal and political resources available to the affected, and the choice of strategies. Africans have experienced many famines, wars, and droughts in the past few decades, and many Africans are currently living (and dying) in crises.

Crises provide social scientists with valuable opportunities to study and try to understand human activity and the evolving relationships among people, their total environ-

ments, and their strategies for survival and success. There are important scientific reasons why social scientists should disregard customary categories that divide and segregate natural disasters from war, natural from sociopolitical causation, and local level social domains from larger sociopolitical and socioeconomic units. This segregation of empirical events and scientific research and communication restricts our ability to formulate frameworks and theories that are more insightful and to provide more effective guidance for policies and programs to help people in their responses to recurrent crises.

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